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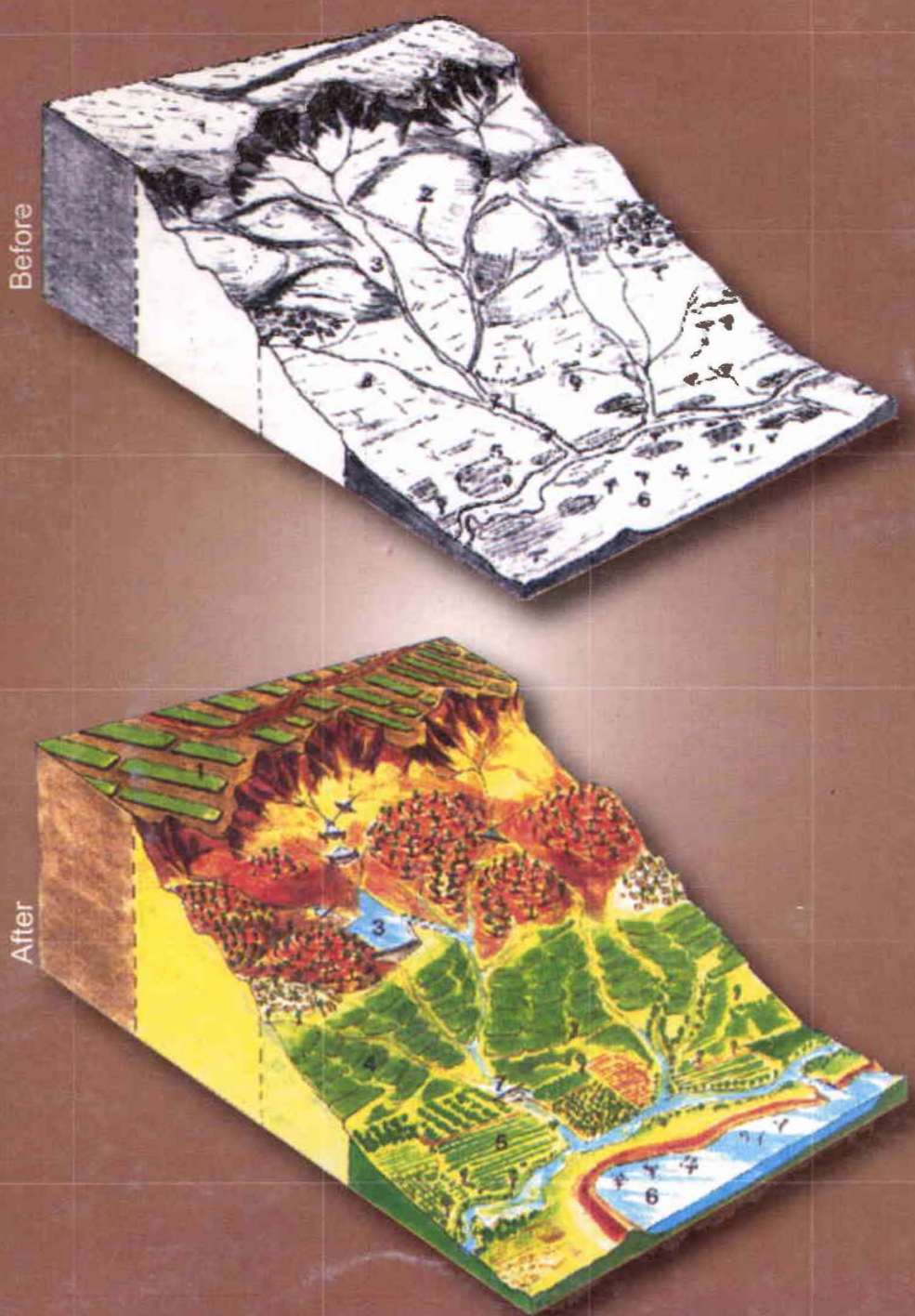
Part 2

Community Based Participatory Watershed Development: A Guideline

Annex



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Part 2

FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

Community-based Participatory Watershed Development: A Guideline

Annex

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Acronyms

CWT	Community Watershed Team
DA	Development Agent
FAO	Food and Agriculture Organization of the United Nations
HH(s)	Household(s)
LLPPA	Local Level Participatory Planning Approach
MERET	Managing Environment Resources to Enable Transition to more Sustainable Livelihoods
MoA	Ministry of Agriculture
NGO	Non-Governmental Organization
PD	Person Days
PI	Problem Identification
PRA	Participatory Rural Appraisal
PWDP	Participatory Watershed Development Planning
SS	Soil storage
SSI	Semi-structured interviewing
SWC	Soil and Water Conservation
WFP	World Food Program
WR	Wealth ranking

Annex 1

Participatory mapping and understanding of the Target Area

1 Participatory Mapping

Participatory mapping promotes interaction and helps visualize the `mental map' of villagers. Yet the team has to determine the type of map it wants to draw. It can be a social map (social services, health status of individuals, population and housing), a natural resource map (forest, water, wildlife) and the like. In other words, maps can be drawn for many topics: demography, social and residential stratification (wealth, ethnicity, religion), a village use of natural resources, fields and land use, soils, water resources, spatial arrangement of a house, use of space by different social groups, and mobility of people from place to place. Annex 3 provides some examples.

Using maps makes it easy to indicate resource availability, to assess infrastructures and access, and even to identify wealth/social groups and relationships. It also stimulates discussion and debate.

1.1 Steps for participatory mapping

- Decide what sort of map should be drawn (social, natural resources, farms, and others),
- Find people who know the area, the topic of the mapping exercise, and willing to share their knowledge,
- Choose a suitable place (ground, floor, paper) and medium (sticks, stones, seeds, pens, pencils, chalks) for the maps,
- Help the people get started but let them draw the map by themselves. Be patient and don't interrupt them. It is their map!, Sit back and watch but facilitate the process, and
- Keep a permanent record on paper including the mappers' names to give them credit.

2 Transects

Transect is a cross-section or straight cut through the community in order to capture the greatest diversity or ecosystems, land use, and the like. Transects can be geographical, historical, and others. A geographical transect is a diagram of main land use zones. It compares the main features, resources, uses, and problems of different zones. Historical transects are time lines that cut across time (see forthcoming sections). Mapping and transects are complementary. Often a map can be used to identify a suitable transect line. Transect walk should involve careful observation and semi-structured interviewing.

2.1 Steps of preparing a transect

- Find community members who are knowledgeable and willing to participate in a walk through their village and surrounding area,
- Discuss with them the different factors to be drawn in the transect (crops, land use, trees, soils, and others.) and agree which route to take,
- Walk along the transect that helps you observe the greatest diversity in a short distance,
- Observe, ask, listen while walking,
- Discuss problems and opportunities, (Identify the main agricultural zones and sketch the distinguishing features. For each zone describe: soils, crops, livestock, problems, solutions, opportunities. Draw the transect and cross-check your findings with the informants.

3 Description and Problems of the Target Area

Delineate the boundaries of the community and the sub-watershed boundaries within which the community is located. Carry out the same task for boundaries shared with adjacent and/or upper/lower sites which are relevant to the community. As mentioned in the procedures, the watershed boundaries may not coincide with the community ones, particularly if for geographical (drainage) and technical factors (treatment requirements) a larger area is to be considered. In that case, more than one community plans should be involved and specific joint interventions designed, planned and shared to be developed following watershed logic.

3.1 Natural resources and assets village map (by the Community Watershed Team/CWT)

Ask the CWT to sketch on the ground (DAs have to report and copy it on paper) or on a flip chart the map of the community. Ask the team to also sketch major watershed units. These major watershed units should report the main features related to land use and their value in terms of productivity and basic community assets. This is based on their perception. For example: the best land for teff or other crops, best land for coffee, enset, chat, grazing, poor cultivated land for most crops except for barley and chick peas, poor grazing land, good forest, bush land, waterlogged areas, woodlots, homesteads, schools, churchs, stores, health post, road, foot path, market, mountain peaks, lake, drainage, and others.

Usually, this map is done by using local materials such as sticks, pebbles, chalk, seeds, paper, markers and others. The exercise is usually a rough work but it gives an idea on how farmers visualize their land and the assets on it. Refer to Figure 1.1 for an example of farmers mapping.

It would be most useful to undertake this exercise for men and women separately to enable comparison of views of both sides and value given to the different land types/uses and assets. At the end of the exercise, discussion on both sketches will be undertaken to share views and raise mutual awareness.

4 How to Draw a Village Map and Transect Sketch

(by the Community Watershed Team)

4.1 Drawing a village map

In Step 4 of the main PWD procedures, Part 1 (*Community-based Participatory Watershed Development: A Guideline*), it is recommended that members of the CWT should draw a map of their own village area, inclusive of land use, the main assets (churches, homesteads, health post, roads, school, wells, and the like), and other features such as drainage, mountains and lakes.

The intention is for the DA and the whole CWT to visualise their area and for villagers to familiarise themselves with what they consider more important as assets. The map made by women usually emphasises homesteads, water points and forest areas, whilst maps made by men provide more details on the type of cultivated and grazing lands (fertile land, less fertile, fallow, waste land, and others). This exercise is important for the farmers (both genders) to agree on a visible projection of the land resources and their value. A useful exercise would be to compare this map and the accurate base map resulting from the field survey.

4.1.1 Procedure for drawing a village map

Several methods can be proposed to produce a village map. The simplest way for the CWT(s) is to draw a map to the very bare soil by using sharp sticks and other simple materials such as stones, pebbles, and straws. They can roughly delineate the boundaries, drainage and main land use, and all the other main features of importance. In this case, you have to report the map to a piece of paper for future reference.

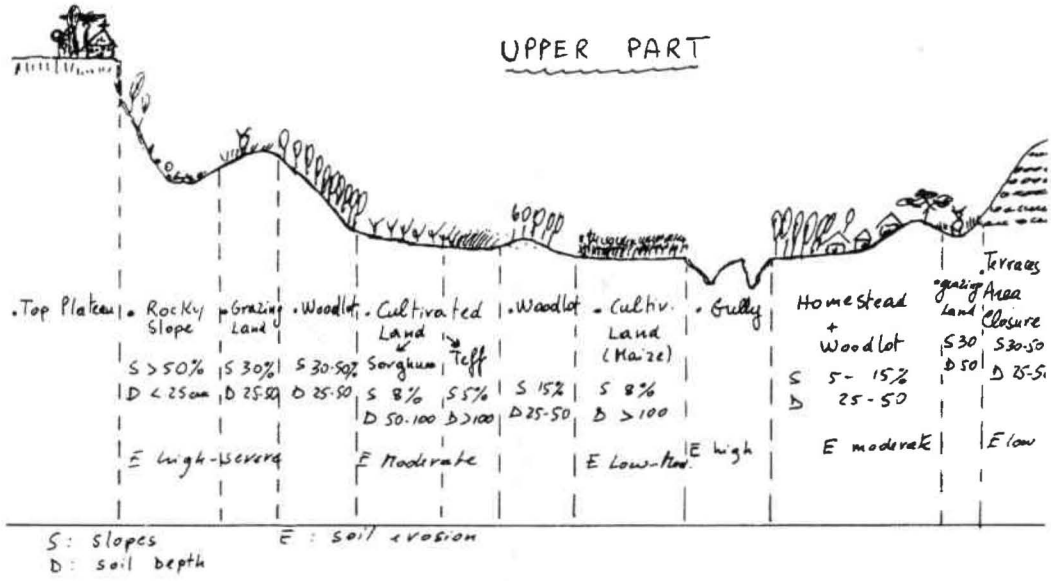
However, a better village map can also be done on a flip chart or on any piece of scrap paper with pencils and markers. It is sometimes amazing how good some farmers are in drawing. They may try several drafts until they feel satisfied about the map. Allow the men and women to do their own map, even if they belong to the same planning team. Figure 1.1 shows a typical example of village map.

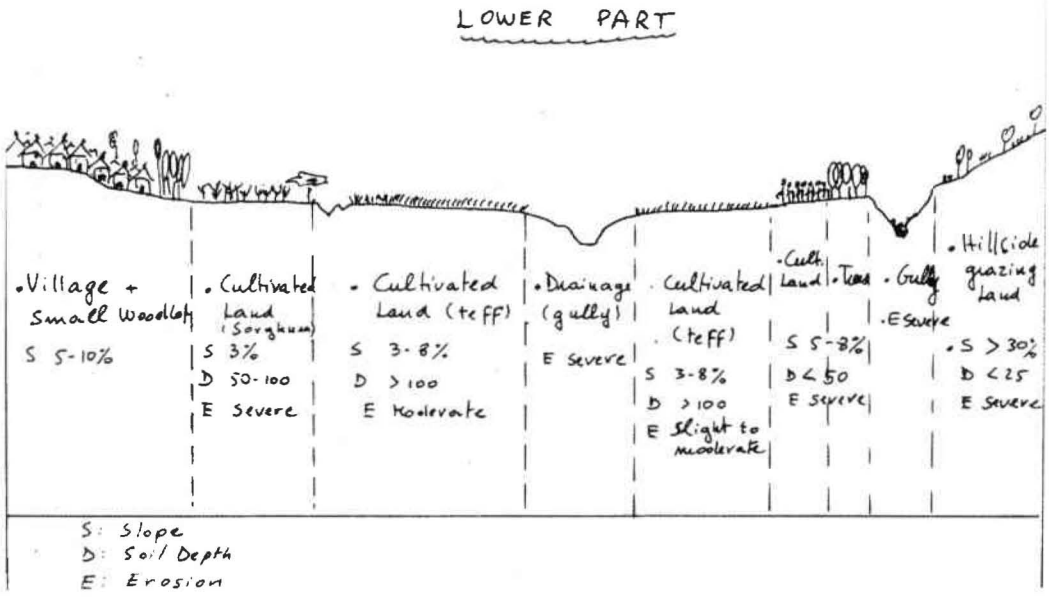
4.1.2 Drawing a transect map

- Similar to village maps they have drawn, farmers can also draw transect sketches of most relevant sections of the planning area. A cross section provides more information on farming systems, perception of slopes and vertical dimension of the area. Two or more transect sketches are often needed. Figure 1.2 shows a transect sketch.

Figure 1.1 Villagers' map

Figure 1.2 Transect sketches





Annex 2

Participatory mapping and Socio-economic Survey

A number of participatory planning tools and methodologies have been developed and tried out in Ethiopia. Most of these approaches emanate from combination of planning tools inspired by various methodologies and adaptations at the local level. However, the common ones are: (1) Participatory Rural Appraisal (PRA), (2) Farming Systems Development, (3) Participatory Land Use Planning, (4) Participatory Watershed Planning, and (5) Local Level Participatory Planning Approach (LLPPA), to name a few. The following tools are extracted from several of these approaches and supplement the procedures for PWD provided in Part 1 document *(Community-based Participatory Watershed Development: A Guideline).* The information provides guidance to DAs and wereda experts on how to engage and consult with communities to jointly prepare a workable, socially acceptable and technically sound community-based watershed plan.

1 People's Participation

1.1 Defining participation

What do we mean by people's participation? People's participation is defined as employing a method where the community is motivated to function and contribute as a group to perform various tasks they all contributed to identify, select and design.

In any society, there are different levels of interaction, not only "rights" but also "responsibilities", a judicial system that looks after conflict resolution, traditional structures and religion, different levels of vulnerability, intra and inter community relationships, State laws and regulations, and others. In other words, a community is made up of all these interactions, some defined as coming from "inside", and others coming from and going to the "outside". This includes use and management of land resources, people's assets and farming system, economic activities and coping mechanisms. Participatory watershed planning should capture the essential components of all these elements and interactions to formulate a development plan that satisfies both the community in terms of addressing the main needs and aspirations of its members, as well as fulfill the principle of sustainability of the use/management of natural resources.

Why should people participate? It is generally agreed that unless the direct and visible benefits of the program are in line with the interests of the people, participation comes slowly. Experience has shown that it is not very difficult to organize and convince people to undertake useful and profitable activities for a while, but sustaining such interest over a long period has been difficult. The sustainability of watershed management development projects therefore, depends on the level of participation, which requires effective planning and implementation. Participation builds ownership of the people over the resources being managed in the program. Planning with the community also increases participation and produces better results

1.2 Participation and local level institutions

Rural organizations are a key element both for participatory planning and for the sustainability and continuity of the project once implementation begins. Without them, no dialogue can take place between government agencies and the watershed beneficiaries. Consequently, bottom-up planning cannot exist.

Government agencies need to identify appropriate rural institutions, and formal as well as informal leaders that could speak on behalf of the group or community. There are no established rules or models for rural organizations, and several will be important for their involvement in watershed management planning and implementation. A group may be formed on the basis of a variety of interests common to its members: religion, trade unions; growers associations (coffee for example); grazing or livestock associations; extended family; common boundaries; women's groups; cooperatives; and others. The important question is not what it is but how well it functions, how well it represents the interests of its members and to what degree its leaders really speak on behalf of all members. Therefore, the focus should be on strengthening and/or building **appropriate** institutions that would be directly involved in watershed development activities on different levels.

For planning, a community watershed team (CWT) is essential and can be created from existing institutions and associations. Its members should be elected fairly and represent the main interests of households and their livelihood profile, including vulnerability and social status.

Associations or groups are important to support watershed development and make it more effective. Associations and groups should be responsible to discuss and agree about what can be done using self-help contributions and what needs other forms of support. Self-help contributions can be generated using self-help institutions or modalities of mutual support. For example self-help groups (SHG) can be formed building upon traditional work parties (such as *wonfel* and *debo*), traditional structures (*edirs*, and the like), economic/ common interest activity such as black smith, potters, weavers, dairy and goat rearing.

The contribution of self-help groups (SHG) to watershed planning and implementation could be at various levels. Firstly at decision making level for interventions planned at the scale of individually used lands and for interventions that may need to be implemented in communal areas. Secondly, self-help efforts could also be a collective effort undertaken by the community for specific activities targeted to help specific categories of people, particularly some vulnerable ones (for example women headed households). Thirdly, the role of SHG should not be seen only as a means to provide the groups' own contribution. Its role should also be to efficiently utilize available resources from other sources (projects, safety nets, and the like) to cover specific areas and activities as well as to help most vulnerable categories of people in the community. In this regard, the role of SHG is broader and should include modalities for using part of the available resources (internal and external) to assist those most in need.

For a specific combination of activities, User Groups (UGs) can be formed. Examples could be hillside closure groups, community plantation groups, quarry development groups, rangeland development groups, water pond users groups, and the like. Some groups already exist while others can be created based upon the watershed development activities. These groups have to be fully involved in planning, implementation and maintenance of their respective development activities. Group-wise planning helps to treat the area in an integrated way.

Tool kit for stakeholders' analysis

Use: Analyze organizations in an area (outside and internal) and identify existing groups that extension should work with, and how DAs relationship with farmers in the area could be improved

Procedure:

- Ask farmers to make a list of all organizations that they know. Prompt farmers to list GOs, NGOs, credit institutions, and the like. Do not mention specific organizations.
- Ask farmers to prepare a circle for each organization, where the size of the circle indicates its importance. A big circle will indicate that farmers perceive the organization to be important to them.
- Now ask farmers to draw a large circle to represent their area.
- Ask them to lace the organization circles near the circle representing their area, so that the distance between the two indicates the strength of the relationship between them. Close means a strong and good relationship. Far away means a weak and bad relationship
- When farmers have finished the drawing, ask questions. Why do some organizations have a strong link? Why are some organizations important? Is the DA represented? What is the DA's relationship?

1.3 Participation in problem identification and ranking

1.3.1 Problem identification

The next step is to conduct problem identification exercise together with the CWT in order to identify the most important problems facing farmers and their possible solutions. Watershed management is a problem-oriented approach. It is important that major problems be carefully defined at the beginning (the first step) of the planning process. Generally problems are recognized as related to crop and livestock production (e.g. pest and animal disease), physical (waterlogging, land slide), environmental (drought, deforestation, soil erosion), economic (lack of credit, limited purchasing power, low incomes, etc.), infrastructure-related (access roads, access to basic services such as health and education), institutional, social or cultural factors, and the like.

In defining problems, pay attention to the following three issues:

- Distinguishing problems from causes and solutions
- Distinguishing between symptoms and problems
- Interactions between problems.

There should be consensus among the farmers in the ranking and in determining the severity of the problem. Problems have to be ranked using well-defined criteria such as distribution and seriousness of the problem. One example of a problem analysis and ranking format is shown on Table 2.1:

Table 2.1 Problem analysis and ranking format

Problem	Main causes (*)	Severe	Medium	Low	Rank
Shortage of drinking water					
Shortage of crop land					
Shortage of food crops					
Shortage of fuelwood					
Shortage of construction wood					
Shortage of grassland					
Shortage of fodder					
Problem of pest					
Problem of rodent					
Problem of soil erosion					

(*) Most of these problems are interrelated – it is important to discuss and highlight the main causes of these problems. This is useful to start making the community aware about why problems occur and their relationship with the land resources and socio-economic issues. You can also group the problems following the main categories below and develop your own "user friendly" problem identification table.

Problems in a watershed could be categorized as follows:

- Physical problems: These problems are usually not difficult to detect or identify. Steep slopes, badlands, slide-prone soils, weak geological formations, and others can be identified by observation.
- Resource use problem: Problems such as shifting cultivation, forest destruction, poor road construction, uncontrolled mining, and others, should be identified if possible with their causes.
- End problems: The final effect of watershed degradation-soil erosion, land slides, heavy sedimentation, flood, disappearance of springs, low productivity, higher risk of drought and related increased fragility of the ecosystem, must be identified.
- Socio-economic and other problems: Serious socio-economic problems can be major obstacles in carrying out watershed development works. These may include land tenure, conflict over land and water resources, low incomes and off-farm income generation opportunities, low education and poor access to health services, cultural barriers, low acceptance of innovation, gender, seasonal shortage of labor, and others.

The PI described above is one of many methods. DAs and the community can also group problems by main category or groups and undertake the problem identification. Problems can also be identified by gender groups. If not, at least summarize what are the major problems identified by women. At the end of the PI and ranking exercise try to understand the **reasons why problems occur and divide the problems as principal and secondary problems or into major causal ones and others more related to the effects of specific interrelated problems**. For example, low fertility is not to be associated to lack of fertilizers but to erosion and lack of proper rotation, insufficient organic recycling, and others. This, in turn, could be caused by lack of sufficient energy for firewood, thus the use of cow dung as combustible, the complete removal of crop residues for livestock and the use of monoculture of cereals to fulfill basic food needs, and the like. Similar examples can be made, for instance on access to sufficient and safe water, closely associated with deforestation and consequent depletion of water-tables, drying of springs and siltation of reservoirs by severe erosion. Linkages to problems should guide linkages to solutions and those should be discussed along the identification of problems and their ranking.

1.3.2 Problem ranking and analysis

Ranking or scoring means placing something in order. Ranking can be used as part of an interview, or as analytical tool by itself. Ranking reveals differences in priorities, and help to understand the criterion used in doing so. This exercise is undertaken after or simultaneously with the PI. Ranking also helps to compare priorities and discuss opportunities for community members of different social status. Ranking differ from poorest to better off members in the community. However, understanding the priorities of different groups is very useful as it allows finding common interests and relationships between those groups and avoids potential conflict. For example, poorest members may be interested in getting a share of an area closure to increase their asset base while farmers cultivating fields below such closure may agree on such a share if they perceive it as a control flood mechanism that avoids damage to their cropland. There could be also additional agreements on sharing benefits.

There are a variety of situations that should lead to solutions and mutual benefits in contrast to conflict. In case of the area closure example, it may occur that part of the community would disagree in closure as some farmers may see it as less space available for their animals to graze. In this case the closure should be undertaken in phases, benefits shown and livestock management improved (tethering, fattening, and others). The users of the closure could also become service providers for those who have livestock, for example by providing animal feed and getting part of the income from sale of livestock in return.

Ranking methods are also useful to deal with some sensitive information, especially for income or wealth. Informants tend to be more willing to provide relative values regarding their wealth than absolute figures. For instance, it is easier to ask a farmer to rank his income sources by importance rather than asking him how much he earns. Note that ranking scores are easier to obtain than absolute measurements.

There are four types of ranking commonly used in participatory planning – preference ranking (ranking by voting), direct matrix ranking, pair-wise ranking and wealth ranking.

While undertaking any ranking exercise -
- let people do it their own way
- use people's own unit of measurement
- use local names and materials
- be patient, probing and eager to learn.

Preference ranking implies voting for selecting priorities. Use card sorting or tally people's preferences by vote.

In watershed development planning, ranking problems should be participatory but simple. Land users may get easily irritated by complex procedures for ranking as they are usually clear about their utmost problems and priorities. This exercise should also be undertaken with tact as it often occurs that specific households would not appreciate being placed in specific categories and signaled to others as destitute or extreme poor. There should be a general consensus about the importance of specific issues and problems but the focus should be on the solutions and means to reverse negative trends. All groups (not few individuals) should feel they are part of the solutions.

No single procedure fits all situations. Several methods are explained in detail in various participatory guidelines and PRA tool boxes which can be referred to for additional guidance. Some of them are listed in the References section, Part 1 of the main document (Community-based Participatory Watershed Development: A Guideline).

Wealth ranking (WR) is an exercise used to assess and understand household profile in terms of assets and income levels, thus related to capabilities, resilience to shocks, food security and other socio-economic parameters. Further, wealth ranking is used to understand and address factors determining vulnerability. WR is also used to have fair representation in planning teams, i.e. select members of different wealth groups so as to voice every category's needs and aspirations.

2 Socio-economic Survey and Analysis

The socio-economic survey reinforces the PI exercise. PI serves to outline main problems and start identifying possible solutions, bringing the community and field staff to visualize the main causes and interrelations between problems and list some main activities that need to be done to address those problems.

Socio-economic and biophysical assessments follow next to:

- to verify the PI findings and consolidate understanding of both problems and solutions
- to build ownership over the solutions found and further strengthens the relationship between the DAs and the community as well as reinforces solidarity thinking
- to clearly visualize the watershed logic and the priorities in terms of where, what and how to start the treatment of the various parts of the watershed. This also allows to engage those households located in most sensitive parts of watersheds and involve them in the selection and design of measures. This would also imply finding additional solutions and means of support for those most in need, those who are often located in the most sensitive parts, such as steep slopes and eroded parts of the watershed
- link the biophysical aspects to the socio-economic problems in detail to highlight new opportunities based on watershed logic
- understand the linkage between communities influenced by a common sub-watershed line and the benefits of joining hands to carry out specific measures. For instance, to treat large upper portions of hillsides to induce rising of water-tables.

2.1 Use existing information

2.1.1 Review of existing reports

Existing reports on general socio-economic conditions of region, zone, *wereda* and *kebele* should be collected and reviewed before planning detailed studies in specific community-based watersheds. The existing reports will give the *wereda*, *kebele* and community planning teams useful basic information, which may be valuable for the preparation of survey proposals, related forms and questionnaires. Already existing studies, local plans and statistics need to be reviewed. Farmers usually get tired of being asked similar questions over and over again and the changes in rural areas are often slow.

2.2 Socio-economic baseline survey

The subject of socio-economic survey confronts a vast array of social condition and economic activities in a watershed. Before beginning a baseline survey, a series of decisions should be made on enumeration, types of baseline data, sampling method, total sample, period of survey, existing reports (note many in the Ethiopian context) on general socio-economic conditions, and the like.

2.2.1 Design and use of questionnaire

Questionnaires need to be carefully designed. They should be concise and constructed in a logical order. The questionnaire should be prepared in such a way that the necessary information on the following items is obtained and described:

- community background (profile)
- agricultural development problems
- water uses
- land degradation
- traditional and conventional watershed development techniques
- marketing and rural infrastructures
- role of different community members, especially of gender and development, and others.

The CWT will select the most appropriate and useful set of techniques each time a PWD exercise is done and should experiment with, invent, and adapt methods as necessary. Some of the methods will be briefly discussed below. One example of questionnaire is attached in Annex 9. Many simple to complex questionnaires exist in Ethiopia which could be used to develop a sound socio-economic questionnaire.

2.3 Collection and analysis of secondary data

Secondary sources refer to information available for use, whether published or unpublished forms. We need to assess them in order not to collect already available data and not to spend time and resource.

The major sources of information are maps, photographs, images; government records and official reports; media reports, research publications, and anthropological and ethnographic studies. The areas we need to get information are the natural and socio-economic environment and the prevailing agricultural systems.

The purpose of collecting and analyzing secondary data is:
- to summarize the existing information,
- to identify information gaps,
- tentatively identify social strata
- tentatively identify problems and development potentials.

And this task must be collected at least a week before going to the field. Information so gathered has to be compiled in different forms such as:
- summarized paragraphs
- tables, diagrams and graphs, and
- copies of maps and photographs.

While doing so be cautious and
- be critical and identify information/knowledge gaps
- screen relevant data.
- be skeptical while using reports that might indicate staff performance.
- make sure that the data are sufficient and reliable, and that
- you do not over-spend your time in reviewing data.

2.3.1 Semi-structured interviewing

Semi-structured interviewing (SSI) is a form of guided interviewing where only some of the major questions are formulated in advance. Most of the questions are formulated during the interview based on the interviewee's response and the critical area of interest for the interviewer. In contrast to the formal survey questionnaire, many questions will be formulated during the interview (as in a journalistic interview). If it becomes apparent during the interview that some questions are irrelevant, they can be skipped. Questions usually come from the interviewee's response, the use of ranking methods, observation of things around, and the CWT's own background and experience.

The different forms of semi-structured interviews include (1) key informant interview, (2) individual interview, (3) group interview, and (4) focus group discussion.

Key informant interview. Key informant interviews help to obtain special knowledge. A key informant is one who has special knowledge on a particular topic (merchant on transportation and credit, midwife on birth control practices, farmer on cropping practices). Key informants are expected to be able to answer questions about the knowledge and behaviour of others, especially about the operations of the broader systems. While there are well-known risks of being misled by key informants' answers which makes cross-checking necessary, key informants, nonetheless, are a major source of information for any participatory planning approach. The key informants may also be outsiders who live in the community (like school teachers) or people from neighbouring communities (outsiders with inside knowledge), including people who have "married into" the community. They usually have a more objective perspective on affairs in the community than the community members themselves.

Individual interview. Individual interviews are conducted with an opportunity sample of purposely selected individual respondents. An opportunity sample of farmers would include farmer leaders, innovative farmers who have tried recommended technologies or successfully developed improved technologies, women farmers who are both members and heads of households, farmers who represent major cropping systems in the area, poor farmers with very limited resources, and traditional farmers who have resisted new technologies. Interviewing a number of different farmers on the same topic will quickly reveal a wide range of opinions, attitudes, and strategies. Individuals are asked about their own knowledge and behaviour, and not what they think about the knowledge and behaviour of others.

Information obtained from individual interviews is more personal than one obtained from group interviews, and is more likely to reveal conflicts within the community since respondents may feel that they can speak more freely without their neighbours present.

Group interview. A group interview is undertaken to obtain community-level information. Group interviews have several advantages. They provide access to a larger body of knowledge, and provide an immediate cross-check on information as it is received from others in the group. When groups become too large (more than 20-25), however, management becomes more difficult as the group tends to break into smaller subgroups.

Group interviews are not useful for discussion on sensitive information. They can also be seriously misleading when the questioner is believed to have the power to control benefits or sanctions. Group interviews may reveal people's ideals rather than what actually exists, but triangulation of methods and cross-checking of information will reveal the whole picture. The interviewers should encourage alternative views and opinions and probe to avoid group pressure. Informal conversations after the meeting can be useful to get information from those who were not able to express their opinion during the

group interview. Group interviews require more advance planning and preparation than individual interviews.

Focus group discussion. This is used to discuss specific topics in detail. A small knowledgeable group of people (6–12) interested in the topic(s) are invited to participate in the focus group discussion. Focus group interviews are useful to understand the role of women, the youth and to discuss issues with specific groups such as potters and other potentially discriminated groups. They are also useful for specific groups engaged in specific activities.

Although SSI is one of the most commonly used tools in participatory planning, it is one of the most difficult to do well. The following tips would help.

Before the interview:

1) prepare yourself for the interview. Be well-informed about the topic to be able to ask relevant questions and show an interest in the interviewees' responses
2) settle some technicalities - team composition, handling sensitive topics, issue of translation if necessary, and others
3) develop topical guidelines, and agree on team role
4) be aware of the impact that age, gender, class, or ethnicity of team members may have on the quality of the collected information (e.g. in many societies, female interviewers are better suited to interview women than males)
5) design a rough outline for the SSI, which will be refined during field work. Better start with general inquiries on a certain topic and add more detail and depth as the discussion progresses
6) choose appropriate interviewees for the topic, based on their knowledge, age, gender, status, ethnicity, and others
7) try to obtain a broad overview of the socio-economic stratification of a community. First find someone who is familiar with the community (community member or community development worker) who can draw a map of the community indicating the different quarters and socio-economic, ethnic, and religious groups. Select a number of interviewees from each category (male, female, old, young) based on availability (opportunity sample)
8) keep as low a profile as possible - small team, small note books, few vehicles (walk as much as possible). Blending into the local context as much as possible is the best strategy
9) be aware of the daily schedule of the community members. Time interviews so they do not interfere with respondents' important activities. Use time between interviews for other planning activities (e.g., observation, mapping, analysis), and
10) announce the interview well ahead of time.

During the interview:

1) introduce the team, explain the objectives, and begin with polite/social talks
2) be sensitive and respectful. Take a seat on the same level as the interviewee (not above) and *begin the conversation with locally accepted polite talk*
3) indications of contempt or disbelief to responses given by community members, such as smiling between team members or even criticisms of the responses must be thoroughly avoided
4) use the same language as the interviewee (colloquial language) to reduce barriers
5) ensure that questions are relevant and phrased in a meaningful and sensitive manner, and
6) make the interview a process where important information develops out of casual conversation

The quality of the information gathered depends in large part on the rapport between the interviewer and the informant. Build trust by showing interest in what is important for the respondent.

7) keep your eyes open for patterns, behaviours, differences, and unusual things. Observe non-verbal indicators such as facial expressions, use of space, body language, tone of voice, touch, and eye contact, as they may reveal a great deal about the respondents' concerns or reservations and provide valuable clues for interpreting the answers
8) questions should always be phrased in such a way that they required explanation (open-ended questions) rather than allowing the interviewee to answer with "yes' or ' no'
9) formulate questions clearly and don't ask more than one question at a time
10) most interviews should be opened with a broad question to allow respondents to discuss the topic
11) start with a general question and then proceed with a series of specific questions For example, after asking, "Can you give us an overview of the trees which grow in this area and what they are used for?, follow with specific questions to find out more about tree use
12) use "why" questions sparingly, because they may put the informant on the defensives and stop the flow of information
13) make questions short and easy to understand, but aim at consistently drawing out more details
14) do not ask leading questions, be objective, and avoid value judgements. For example, instead of "Why is it important to immunise children?" ask "What do you think about immunisation?", instead of "Do you plant sorghum in July?" ask "When do you plant sorghum?"
15) avoid making conclusions for the interviewees or helping them to finish their sentences, even when they appear to have difficulty expressing themselves. Keep your own comments, knowledge, and conclusions separate from information obtained from the interviewee
16) avoid lecturing and advising. The interviewer is there to learn, not to teach
17) choose proxy indicators for sensitive questions (e.g., household expenses and listing of sources of income as proxy indicators from amount of household income)
18) probe (cross-check) each subtopic to obtain increasing detail and depth on a subject of study during the interview. In order to probe, listen closely to what is being said, challenge answers (where appropriate), and ask for backup information and more details. If you realise that you failed to probe on certain important issues, go back to those questions until you understand the issues clearly. Remember that probing should be subtle cross-checking, not cross-examination. Experiment with different probing strategies
19) show interest and encouragement by nodding, or saying "Yes",
20) pause to let the interviewee add more information, but don't make the pauses too long which may cause embarrassment
21) repeat the question in slightly different ways (e.g., "What are the main dangers facing your children?", "Which problems do you face in bringing up your children?"; "What do you worry about most when it comes to your children?"),
22) use neutral question, such as: "Could you tell me more about that?", "Could you give me an example?", "Could you explain that to me?"
23) weigh responses and don't rely on too few informants. First impressions are often wrong. Test your understanding of an issue, term or concept by using or describing it in subsequent discussions and interviews. If you have misunderstood the issue, the informant will probably correct you
24) have a mental checklist of questions but be open to new questions
25) prepare a list of key questions and key probes which result in a whole series of new

questions (e.g., "What crop varieties have you experimented with in recent years?")

26) case studies, stories, household history and profiles can be used to analyse how a conflict was resolved, what coping strategies were used in a crisis, and such like
27) use contrast comparisons - ask group A why group B is different or does something differently, and vice versa
28) use sequences or chains of interviews (e.g., alternate between group, individual, and key informant interviews)
29) for each interview add general information on the informants as a basis for interpreting responses by different interviewees (age, gender, number of children, material status, religion, socio-economic status). Add the name of the interviewee, if possible
30) good, detailed, and comprehensive recording or note taking is essential for planning. Assign one member of the interview team as note taker (but rotate this task). This allows the other team members to concentrate on the interview and not to be distracted by writing. You need to record what is being said and what you see; don't mix with your own interpretation. Use literal quotations in notes and reports. This is more accurate and gives flair. In situations where proper note-taking is difficult or impossible, jot down a few quick notes as a reminder immediately following the interview or observation. Later, in the evening of the same day, write up complete and detailed field notes. Don't delay this as you could forget quickly, and
31) finish the interview politely. Thank the interviewee.

Common mistakes in SSI that need to be avoided:

- failure to listen attentively
- repeating questions
- assisting/helping the interviewee to give an answer
- asking vague, leading, or insensitive questions
- failure to judge answers (believing everything)
- working only with the less representatives (gate keepers, the well-offs, and others)
- incomplete note taking
- going off the rail (for getting the topical guide) by being overtaken by people's responses, and
- over-generalization of findings, and too much thrust on initial results/responses.

Some aspects of good interviewing worth noting include: (1) informing the community before hand; (2) introducing itself (the team) well and clearly stating the objectives of the interview; and (3) preparing the interview in advance - clear questions and shared responsibilities in such a way that the team would:

- deal carefully with people's expectations and make no promises
- not have official look (in dressing and in manners)
- not rush, and do not interrupt
- not use unfamiliar jargons and English words
- not raise unclear questions or themes that might unnecessarily raise people's expectations
- not disagree among themselves and will not disapprove farmers' opinion
- take "equalized" positions, by paying attention to where they sit, and how they communicate using body language and how they behave
- control "gate keepers"
- encourage people to participate in the discussion
- probe and investigate issues
- listen and not lecture, or raise suggestive questions, and
- make good closings to the meeting and appropriate good-byes.

Listening skills, probing and well-articulated questions are critical to good interviewing. Whether it is better to conduct interviews in group (by taking turns) as opposed to allowing one person with interviewing skill forwarding all the questions by himself/herself should be determined according to the special circumstances the group finds itself in.

Annex 3
Biophysical Survey and Mapping

1. Demarcation (Mapping) and Size of the Area

1.1 Specify the agroclimatic zone (s): _____ % _____
_____ % _____

To find the agroclimatic zone, see under item "*In which Agroclimatic zone do you work?*" near the end of this Annex 3.

You should first delineate the boundaries of the area. You can do it as follows:

- **If a topographic map** with a scale of 1:50,000 is available, it needs to be enlarged twice or four times to the scale of 1:25,000 or 1:12,500, on which you will draw the boundaries. Further enlargements may be needed for small planning units.
- If a topographic map is not available in your area, you **must draw a sketch map** following the boundaries of the selected area
- **To calculate the approximate size of your area** you will use a GRID SQUARE, an example of which is provided at the end of this Annex. The size of your area should be given in Hectares. If available, you may use a planimeter for this task.

  Remember that 1 ha = 1 hectare = 100 m x 100 m = 10,000 square meters.

- SIZE OF YOUR AREA (Community/target group) = _____ha

(If more than one community is involved, repeat all the following surveys)

- SIZE OF THE ENTIRE SUB-CATCHMENT = _____ha

IDENTIFICATION NUMBER (MAP):_____ DATE:_____
TOPOMAP No:_____ SCALE: _____
No OF ENLARGEMENTS:_____
AERIAL PHOTO No: _____ SCALE: _____
No OF ENLARGEMENTS:_____

1.2 Present land use, drainage, community infrastructure, soil and topographic surveys

1.2.1 Land use

- On the topographic map or sketch map of your area, delineate the approximate boundaries of the major land-use types: Cultivated land (Cu), Grassland (Gr), Forest land (Fs), Miscellaneous land (Msc) and others such as villages, homesteads (H),and others. Develop your own legend for additional specific features.
- Within each present land use you may find important differences in terms of slopes (follow % indicated in the Table 3.1 on page 20), soil depth texture and erosion problems. Try to delineate accurately the boundaries between the different areas within the same land use that have such significant differences (dashed or broken lines - for instance Cu1, Cu2, Cu3, Cu4, Gr1, G2, Gr3, Fr1, Fr2, MsBh,and others).
- Then **estimate the proportions of each land-use (and the subunits) type in hectares and in percentage of the total area.** For this task, you should use a planimeter or grid square. Start from the minor land-use types. Subtract from the total area the sum of all minor land uses and find the major land-use type area.

1.2.2 Drainage and community infrastructure

- While mapping your area, indicate the drainage pattern of your area (main river, secondary tributaries, gully lines, and the like). Plot all relevant features regarding infrastructure such as schools, health posts, churches, mosques, roads, stores, nurseries, and the like, present in your area.

1.2.3 Slopes, soil texture and soil depth

- During the area mapping and transect walks, measure the slope of each land use and sub-class based on differences in soil type or slope. Mark the slope with cross (es): very common (xxx), common (xx), rare (x) and nil (o) for each land use (on the same units as above). Use a clinometer or levels to measure slope (see Annex 4). **SLOPES** are categorized based on the following range (table 3.1):

Table 3.1 Range-based categorization of slopes

Slope classes	Range (%)
Flat or almost flat	0-3
Gently sloping	3-8
Sloping	8-15
Moderately steep	15-30
Steep	30-50
Very steep	> 50

- Mark with a cross (es), very common (xxx), common (xx), rare (x) and nil (o) for each land use (on the same units as above) the nearest **SOIL TEXTURE GROUP**. To identify the texture of a soil refer to Annex 4.

- Mark also with a cross(es) the **SOIL DEPTH**: very common (xxx), common (xx), rare (x) and nil (o) for each land use (on the same units as above). The soil depth includes the total depth of the soil to a contrasting layer significant for soil conservation requirements (rooting depth, presence of hard pan, hard sub-soil, and others). Use a soil auger or look at profiles near edges of footpaths, gullies, and ask farmers their view. In general, observe and measure soil depth at least every 100 meters in most terrains, at different changes in slope and soil colour. Classes of soil depth are given on table 3.2.

Table 3.2 Soil depth classes

Soil depth classes	Centimeters
Deep to Very deep	> 100-150
Moderately deep	50-100
Shallow	25-50
Very shallow	<25

1.2.4 Erosion and deforestation problems in your area

- First observe signs of sheet erosion (tree roots exposed, big concentration of stones or gravel in the fields, rock exposure or shallow soil depths) for each land-use type. Then observe rill and gully erosion for each land-use type. Mark with cross(es) and complete the table, the **EXTENT OF PAST EROSION:** very severe (xxxx), severe (xxx), moderate (xx), slight (x) and nil (o). Classification of the various erosion features is given on table 3.3.

Table 3.3 Key for erosion features

Nil	No erosion noticeable	0
Slight	Some surface wash (sheet) and small rills. Slight topsoil loss, no subsoil exposed. Tree/plants roots slightly exposed. Micropedestals observed in upper parts of the field.	X
Moderate	Rills covers most of the surface at regular intervals (after rain showers of medium/high intensity). Bleached spots in several parts of the field surface, much topsoil removed in upper portions of the field (coarser materials left). Pedestals 1-5 cm frequent. Occasionally, small patches of subsoil exposed. Double (transversal) slopes observed as a result of continuous ploughing of rills. Tree/plant roots well exposed.	XX
Severe	Shallow gullies frequent (occasionally deep ones). Most or all top soil removed, the surface layer almost entirely subsoil. Small areas of topsoil remaining exposed. Occasionally, large stones on top of 10-50 cm pedestals. Tree roots almost completely exposed.	XXX
Very severe	Most of the land is dissected by gullies. Only small areas of top soil and upper subsoil are still present between the gullies. The land consists of exposed parent material or rock resulting from the complete removal of topsoil and subsoil.	XXXX

- Similarly, provide information on **DEFORESTATION** (table 3.4) in a particular type of land (mark with crosses): very severe (xxxx), severe (xxx), moderate (xx), slight (x) and nil (0).

Table 3.4 Key for deforestation

Nil	No deforestation noticeable (natural or artificial forests intact and well managed, and others)	0
Slight	Forest start to be affected, few gaps & clearing observed. Some sheet and rill erosion generated from those gaps. Some species start to become rare. Underground bushes moderately affected.	X
Moderate	Several gaps start to appear. Sheet erosion and rills common under trees. Some land below forest start to become affected by runoff generated from cleared areas. Underground bush mostly affected. Most valuable trees become rare. Forest management poor. Regeneration of new trees almost nil.	XX
Severe	Most forest cleared. Scattered trees. Most valuable trees disappeared. Severe erosion frequent between trees and open gaps. Several patches of topsoil removed. Tree roots almost completely exposed.	XXX
Very severe	Forest disappeared. Most of the land is severely eroded. Only very few trees and scattered bush present.	XXXX

Compare land users' perception on erosion problems stated during the socio-economic survey and the results of this survey.

NOTE:

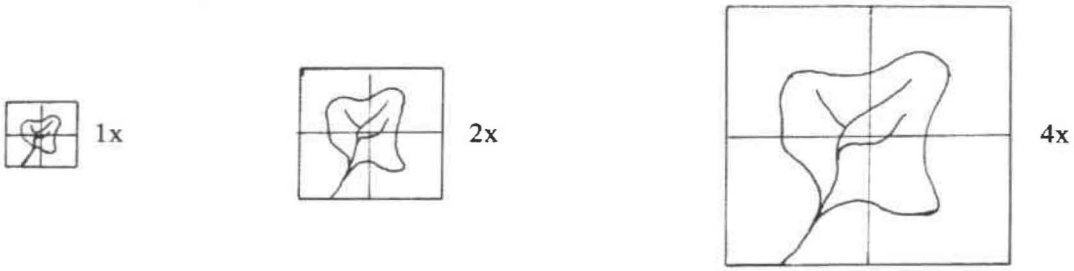
- The procedures indicated above to describe land use, soils and landscape features are one of the simplest designed for this task. The draft Land Classification Method for Use in Soil Conservation is also attached in Annex4 for reference. Provided the work at the field level is carried out with accuracy, the information you have gathered will be sufficient for guidance in the solution identification and design of measures to be implemented. Information on vegetation is already covered in other sections of the socio-economic survey (fodder, wood, and others).
- The physical description of your area should be made together with the CWT so that important information could also be gathered about crop patterns, soil fertility levels, past activities, waterlogging conditions and the like. Farmers always have plenty of information about each part of their community. While walking and making transects (every 100 meters) the discussions with farmers should be geared towards possible solutions to problems encountered.

2 How to Draw a Base Map

2.1 Drawing a sketch map using topomaps

- The easiest way to draw a base map for a PWD plan is from a topomap, if available in the wereda. The scale of the base map must be large enough to show the main features of the selected area. It is suggested to use a topomap of at least 1:12,500 scale which can be prepared by enlarging four times (4x) the topo map of 1:50,000 scale.
- To enlarge a topomap use a pantograph. Otherwise, the method of squares can be applied as in Figure 3.1. For that, carefully transfer square by square the boundaries and other main features of the selected area on a square paper (see next page).

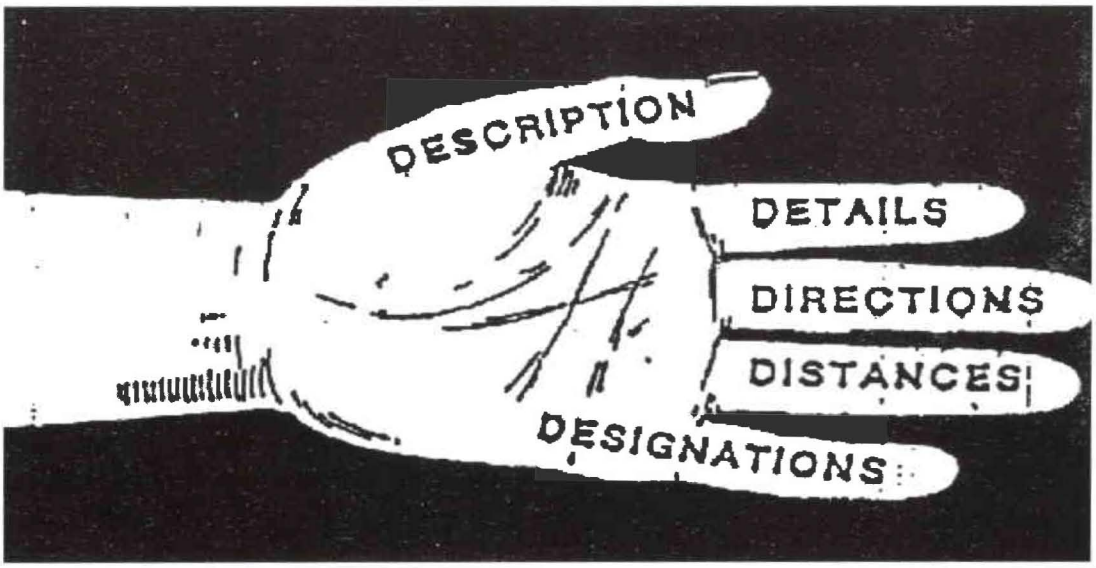
Figure 3.1. Topomap enlargement using square paper



2.1.1 Highlights on map reading

Maps are very important tools for planners and implementers of watershed plans. You can read a map as easily as you can read a book. It will tell you what you want to know about the geographical features of the area in which you intend to work. It does this under five categories as shown in Figure 3.2.

Figure 3.2 Categories of a topographic map.



To know what is meant by these five headings, unroll the topographic map, spread it out fl and take a good look at it:

Description: Name of the map area, location, sources of the map, name of the editi mapping agency, scale and others.

Details: Map symbols, man-made features (homesteads, churches), water features (rivers, streams, lakes), vegetation features (forest, swampy areas), topographic features (hills, valleys).

Direction in a map shows which direction is North, the longitude and latitude.

Distances: Using the map's bar scale, it is possible to know the distances and calculate the areas.

Designations: A map shows the local names of sites, villages, rivers and the like.

A wide variety of topographic maps and map scales are available in Ethiopia through the Ethiopian Mapping Agency in Addis Ababa. The two most useful topomaps are the 1:50,000 and the 1:250,000 scale. The larger scale 1:50,000 series contains more detailed information (20 m contour lines) than the smaller scale 1:250,000 (100 m contour lines). The 1:250,000 series map is available for the whole of Ethiopia.

Scale of maps: The scale of maps is shown as ratio (e.g. 1:50,000 or 1/50,000) and indicates the relationship existing between any TWO LOCATIONS IN THE GROUND AND THE EQUIVALENT DISTANCE ON THE MAP. For more scales and the corresponding distance on the map and ground see table 3.5.

Table 3.5 Examples of scales

Scale	Distance on the map	Distance on the ground
1:5000	1 cm	5,000 cm or 50 m
1:10,000	1 cm	10,000 cm or 100 m
1:26,000	1 cm	25,000 cm or 250 m
1:50,000	1 cm	50,000 cm or 500 m
1:250,000	1 cm	250,000 cm or 2500 m

Map grid: Positions on a map can be defined using one of the two main types of grids commonly placed on topographic maps.

One type of grid system is derived from degrees of LATITUDE (North or South) and LONGITUDE (East or West) which are shown in the margin of the maps. The other type, which is very useful, is the UTM (Universal Transverse Marcator) grid system. The derivation of this grid is quite complex, but it is relatively simple to use. On the 1:50,000 scale series of maps each UTM grid square represents 10 x 10 km or 100 squares km/10,000 ha. These big squares are subdivided into small grid cells of 1 km x 1 km, 1 square km = 100 ha. (see example in page 11). [Give new pp #]The advantage of this grid system is that the grid cells could be still subdivided using a metric graph paper and facilitate the area calculation using the grid squares.

Location of physical features: Information of this kind includes rivers or hilltops, towns villages, roads, tracks, lakes, swamps, and the like. These features can be identified by using the legend given in the maps.

Relief details: Topographic maps contain information about relief, the shape and the form of the land and the relative distribution in space of the components of the landscape. An impression of the topography is obtained from the **contours** printed on this kind of map. They are usually shown in brown color on the maps available in Ethiopia. Contours are lines representing points of equal elevation relative to a fixed base level set at zero. Mean sea level provides the zero elevation on almost all topographic maps. The elevation of contours and landmarks is measured in meters above mean sea level (m asl).

a) *Contour interval:* The interval between successive contour lines varies according to the map scale and the steepness of the landscape. Maps of 1:50,000 scale in Ethiopia usually have a contour interval of 20 meters, while maps of 1:250,000 scale commonly have a contour interval of 100 meters. This avoids unnecessary crowding of the symbols on the smaller scale maps and ensures that they remain easy to read for the user.

b) Reference contours: Not every contour line on a topographic map is labeled with its elevation as this would again tend to clutter the map and make it difficult to use. Instead, reference contours are marked with double thickness brown line on 1:250,000 scale maps at every 500 meters elevation (i.e. every 5th contour) to improve the ease and efficiency of map interpretation. Reference contours are also used on the 1:50,000 scale maps, but are placed every 100 meters. Reference contours are supplemented by elevation labels which can be found by tracing back along the contour. Intermediate contours are also labeled in some cases, but this depends on the density of contours and presence of other labels in the same vicinity on the map.

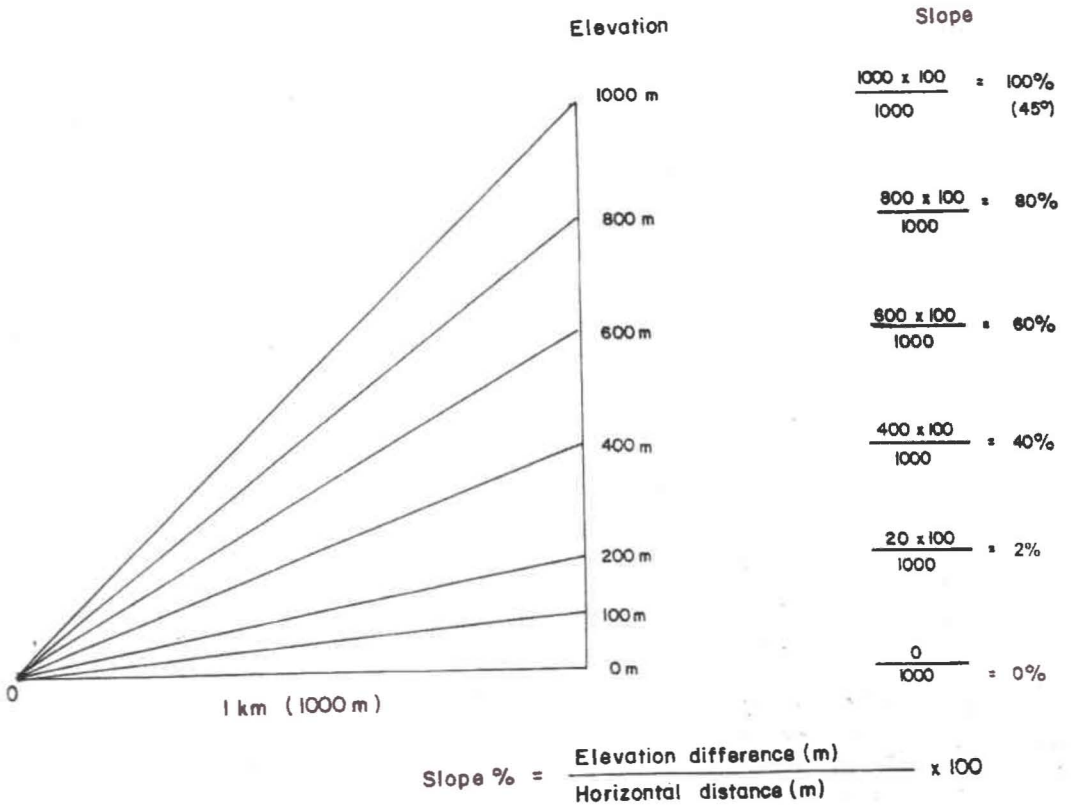
c) Supplementary contours: This type of contours can be found on both common map scales used in Ethiopia. In areas of gentle slope, where standard contours would convey little information on the landform, supplementary contours are added to increase the detail on topography and so make the map more useful. On 1:50,000 scale maps, supplementary contours are added at 10-meter intervals, and for 1:250,000 scale at 50-meter intervals. Contours of this type are usually shown as broken lines with elevation labels.

d) Spots heights: The elevations of landmarks and reference points, such as hilltops and mountains peaks, are also printed on topographic maps.

Spot elevations are given to the nearest meter and printed in black. The precise location of the landmark is marked with a black dot or, in the case of trigonometric reference points, as a dot enclosed by a black triangle.

e) The use of contours: Contour spacing on a topographic map enables the gradient or slope between two points to be measured. If the points lie on two different contour lines, horizontal differences between locations are measured directly on the map and multiplied by the scale factor in the manner described earlier. To calculate the slope for points which lie between contours, which is most often the requirement, interpolation is used to estimate the elevations of the two points. Distance is measured in the same manner as before. Slopes are normally measured in percent, degrees, or as a ratio or fraction. The relationship between elevation, slope and horizontal distance is shown in Figure 3.3.

Figure 3.3 Relationship between elevation, horizontal distance and slope



Closely spaced contours on the map indicate that steeper slopes occur in those locations relative to areas that have less closely spaced contours. This is illustrated in Figure 3.4.

Figure 3.4 Describing contours of a hill and a basin

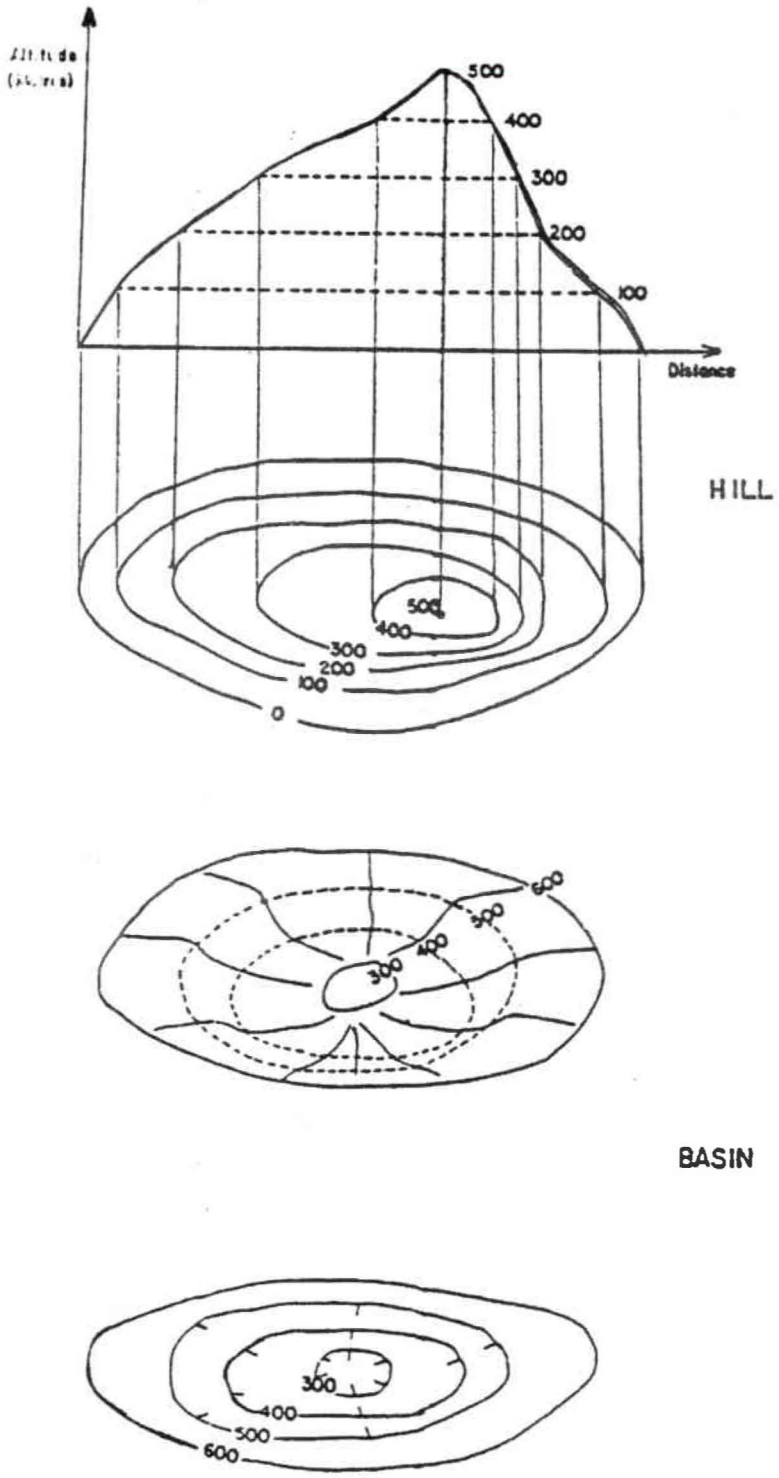
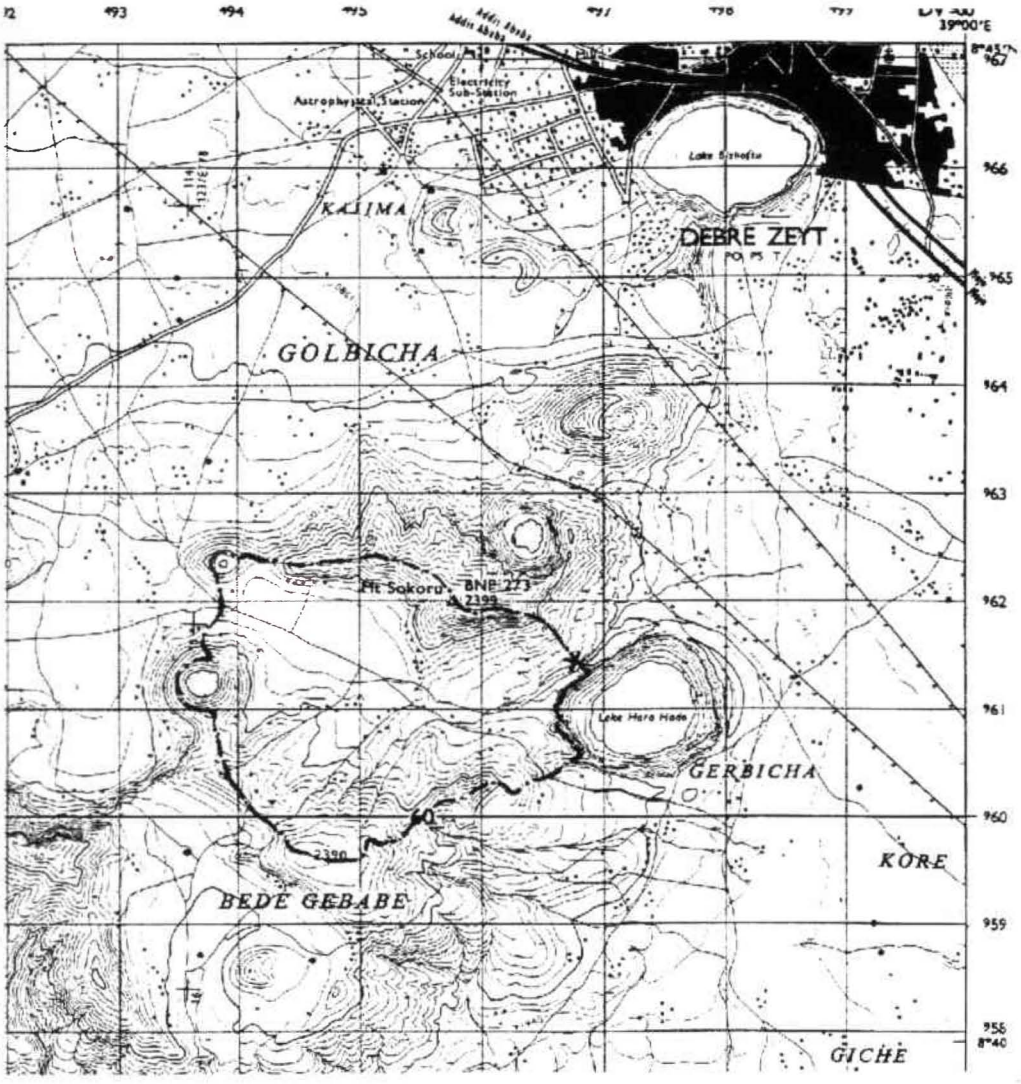


Figure 3.5 Delineating a watershed on a topographic map



X Outlet point (river)
Sub-Watershed boundary

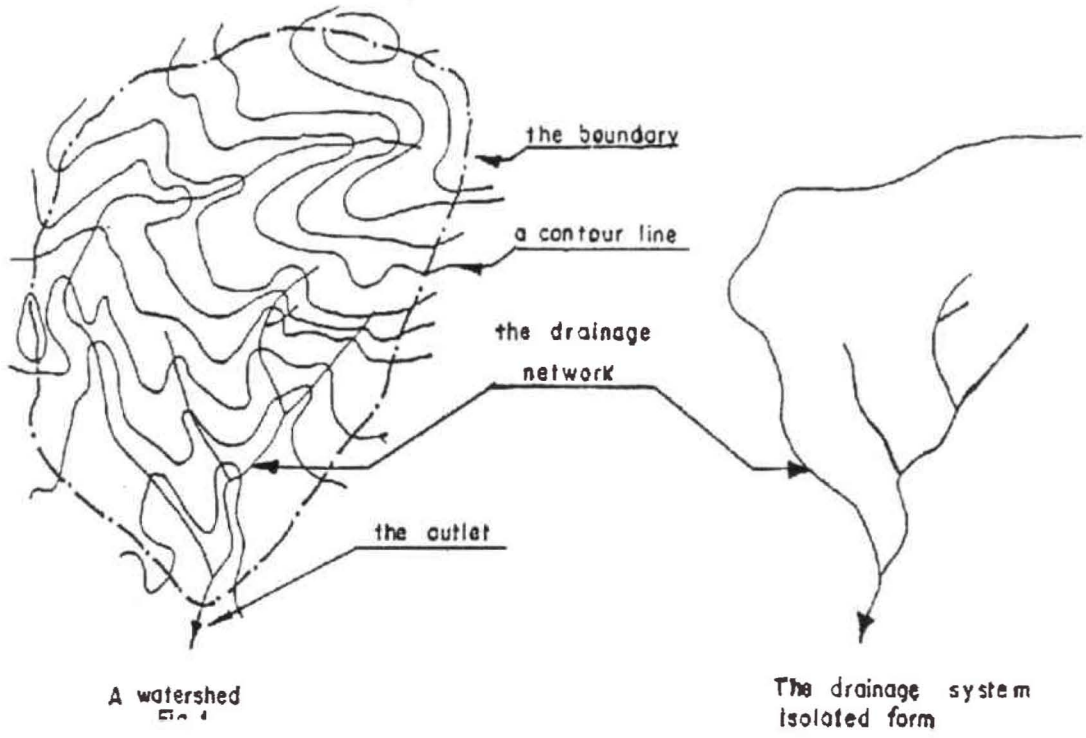
Section of a 1:50,000 scale topographic map
Each grid square has 2 cm x 2 cm or 1 km x 1 km = 100 ha

The catchment is an area determined by a watershed line, i.e. the total land and water surface which is bounded by a topographic water-divider and which in one way or another contributes to the discharge of one stream through a common movement of water to a common confluence point.

The set of all streams (watercourses) forms the drainage network or drainage system of the watershed; the common point towards which tends to convert all the water flowing in the drainage network is the outlet of the watershed. Following contour lines it is possible to delineate a watershed on a topographic map, see Figure 3.5.

Of course, a watershed must be looked not only in two dimensions. The region of the atmosphere above it and the portion of earth beneath its surface (the soil mantle, the geological formations) are linked with the "tangible" and "visible" part of the watershed. This complex inside arrangement can be called the watershed system, or yet and shortly: the watershed (see Figure 3.6).

Figure 3.6 A watershed boundary, drainage lines, the outlet and contours.



2.2 Direction compass

If topomaps are not available, proceed to draw a sketch map using a direction compass. The most accurate way to make a sketch map is by using a **COMPASS AND A METER TAPE OR A CALIBRATED PEDOMETER** (or counting of the footsteps). Example is given on tables 3.6 and 3.7.

The procedure involves 10 steps:

(1) Locate the selected area for planning.

(2) Select your starting point, preferably in a place where you can have a good view of the boundaries of the area.

(3) Stand up at the starting point with a compass and a distance pedometer and pick a landmark following the boundaries of the selected area (if you do not find a landmark send your assistant to stand in the selected point). With the compass record the direction in degrees (0 to 360 degrees) by pointing to the North, South, East and West and measure the slope with a clinometer or an "A-frame" or using the line level.

(4) With the distance pedometer (controlled at zero), walk straight towards the landmark without looking at your compass and record the number of meters in your distance pedometer. Instead of a pedometer you can use a meter tape (50-100 meters reel tape) or count your steps and convert it into meters.

NOTE: To know the average length of your step, measure the length of 10 steps in meters in different slopes. According to your area, you must add (downhill) or subtract (uphill) the following percentages to your number of steps: flat to gentle slopes (+/- 8%), moderate slopes (+/- 8-30%) and steep slopes (+/- 30%).

(5) Keep the record of your measurements (degrees, slopes and distance) on a sheet (see example).

(6) Repeat steps (3) to (5) and continue these procedures until you reach the starting point. From the starting point, make some cross or diagonal checks and keep record of angles and distances (for instance, see Figure 3.7, from point 1 to 3, 1 to 5 and 1 to 8). This will help you to control your measurements, locate possible errors and readjust the map.

(7) Draw the boundaries of the sketch map at the scale of 1:10,000 using a ruler graduated in centimeters and a protractor graduated in degrees (end of the Annex).

(8) When the boundaries are prepared, proceed again to the field. Stand up in a point where you can visualise the main features of the selected area. Then locate and draw approximately the rivers, villages, roads, churches and other prominent features. Make several walks diagonally to reach the main features/land uses present in your area. It will help to have more precise location and measurement of the different elements of the landscape and land use. Delineate as accurately as possible the boundaries of cultivated land, grassland and forest land. Use the symbols given in the **"EXAMPLE: SYMBOLS FOR THE BASE MAP".**

(9) Calculate the size of the area in hectares using grid squares (end of the Annex) or a planimeter (if available).

(10) Problems may arise in closing the boundaries of the surveyed area; in this case if the closing error is large it indicates that error(s) has/have been made in distance or angle measurement or in plotting the field notes. Find out the mistake(s). If the closing error is small, the simplest way is to adjust the error in all points of the polygon.

If a compass is not available, you can still draw a sketch map as follows:

(1) Stand up at a point where you can easily visualise the selected area.

(2) Delineate as accurately as possible the boundaries of the area, locate and draw the rivers, villages, roads, churches and other prominent features. Also, delineate the boundaries of the cultivated land, grassland and forest land.

(3) Traverse the area in two or more main directions depending on the shape of the area, estimating each distance in meters by counting the number of foot steps.

(4) With a ruler graduated in centimeters, draw the final sketch map at scale 1:10,000 or less transferring all the field features.

Use the symbols given in "SYMBOLS FOR THE BASE MAP."

(5) Calculate the size of the area in hectares using grid squares (Figure 3.9).

Some examples of closed traverses and prepared base map are given in figures 3.7 and 3.8, respectively and tables 3.6 and 3.78.

Table 3.6 Making a sketch map with a compass

Points	Degrees		Slope (%)	Distance (m)
1-2	271	NW	3	215
2-3	239	SW	8	210
3-4	259	SW	5	210
4-5	208	SW	15	285
5-6	77	NE	10	220
6-7	105	SE	15	105
7-8	85	NE	15	110
8-9	63	NE	10	120
9-10	93	SE	20	250
10-11	330	NW	15	100
11-12	13	NE	5	215
12-13	50	NE	3	40
13-1	5	NE	10	105

Figure 3.7 Example of closed traverse using compass

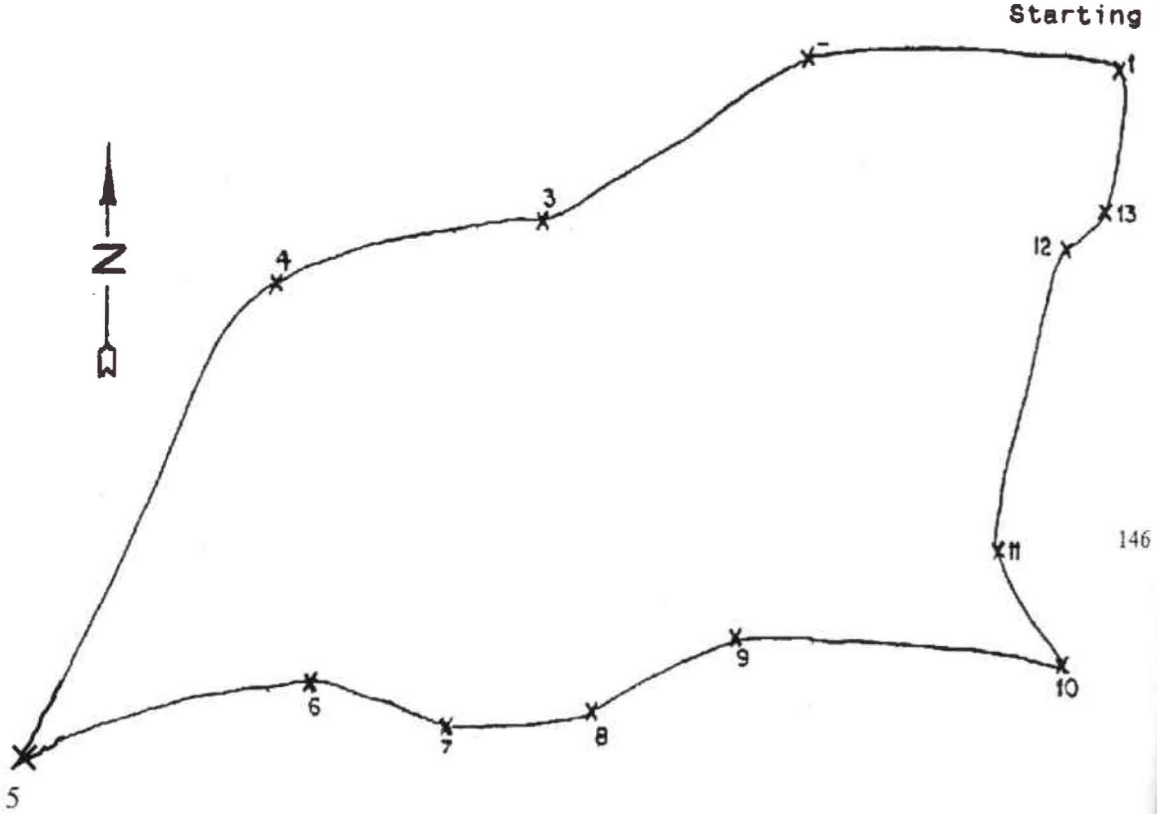
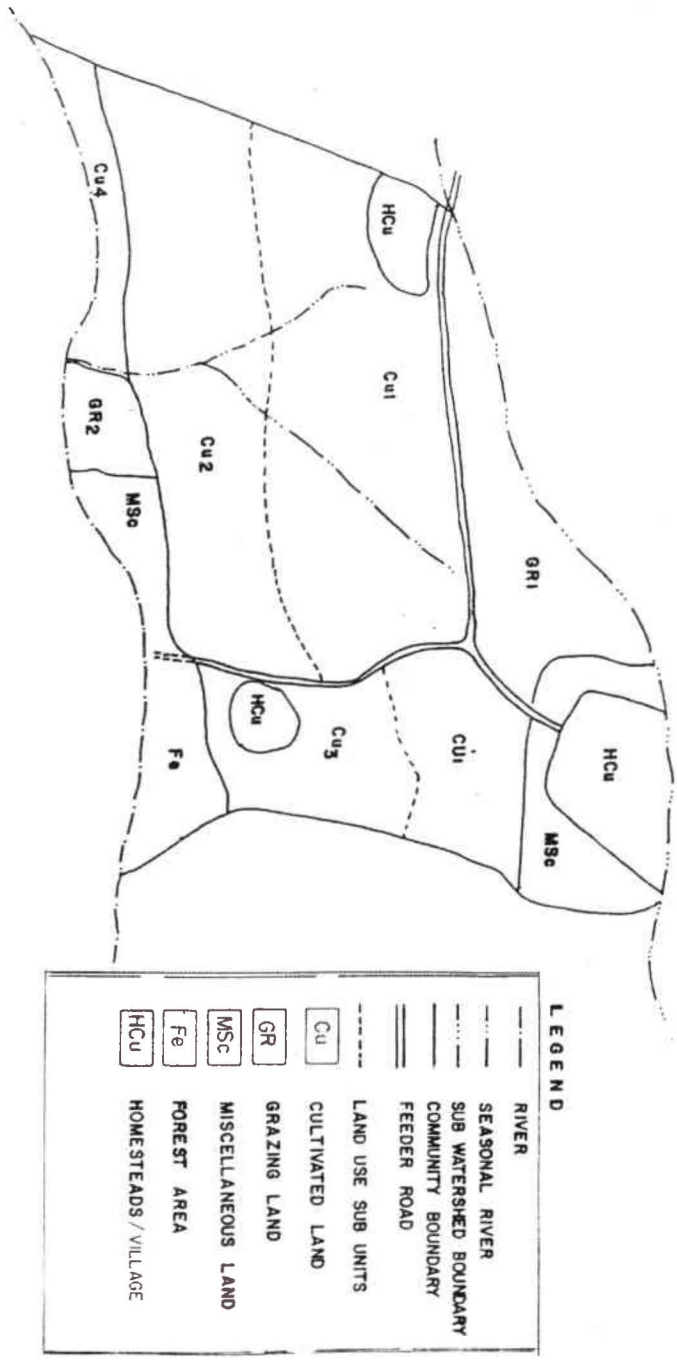


Figure 3.8 Example of a base map

EXAMPLE : BASE MAP



SCALE	AREA IN HA COVERED BY EACH DOT x CONVERTING FACTOR (F)	HOW TO USE THE GRID
1: 5000	0·01 Ha	(1) Place the grid over the area in the map to be measured
1: 10,000	0·04 Ha	(2) Count the dots which fall into the area
1: 12,500	0·0625 Ha	(3) Multiply the total dots (2) by the converting factor (F) of your selected scale
1:20,000	0·16 Ha	
1:50,000	1 Ha	

GRID SQUARE FOR AREA CALCULATION IN HECTARES

$1\,cm^2$ = 25 dots
$5\,cm^2$ = 625 dots

(MoA)

Figure 3.9 Grid square for calculating area in hectares

3 Drawing a Community-based Watershed Development Map

- From the base map, copy in a separate sheet the boundaries of the area, rivers, roads, villages, churches, the boundaries of the land-use types (cultivated land, grassland, and forest land) with a continuous line and the **sub-watershed and sub-land use units** within each present land use (based on main soils and slope differences) with a dash or broken line.
- Draw the selected measures for each land-use type (and sub-units) using the legend shown in the example "**SYMBOLS FOR WATERSHED DEVELOPMENT PLAN MAP**".
- This legend shows options that can be easily seen in the map, with clear and simple symbols. The options are particularly those related physical and biological soil and water conservation, fertility management, water harvesting, flood control and drainage, forestry, agronomic practices and small-scale village infrastructure. Other symbols can be drawn to designate different measures.

Recommendation:

Enlarge the development map several times, use color pencils to draw the measures, write the legend and the symbols in the local language and give it to the CWT or to the leader of the community. You should make community members proud of their work.

Some examples of community-based watershed development maps and their corresponding symbols are given in figures 3.10 and 3.11, respectively.

Figure 3.10 Example of a community-based watershed development map

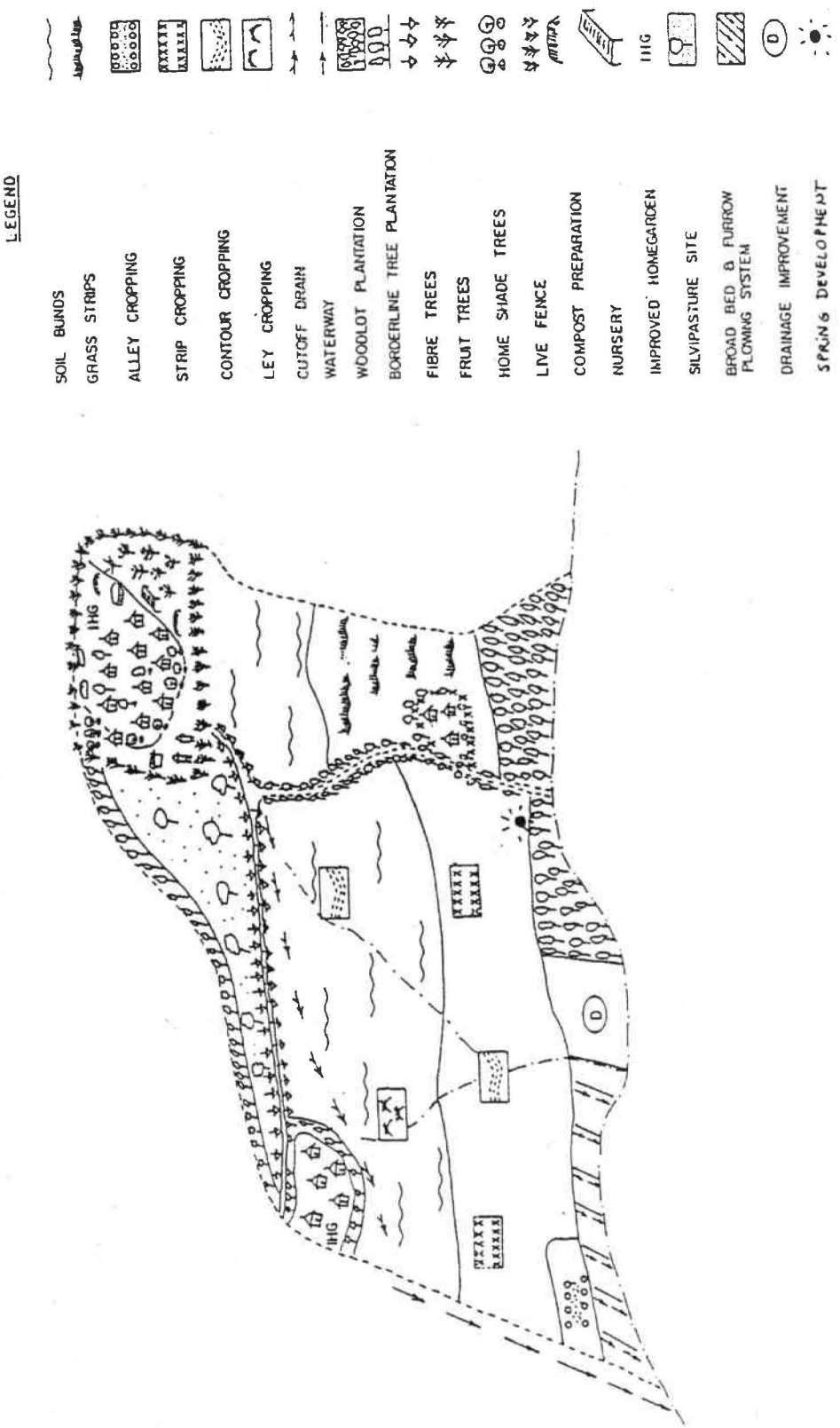
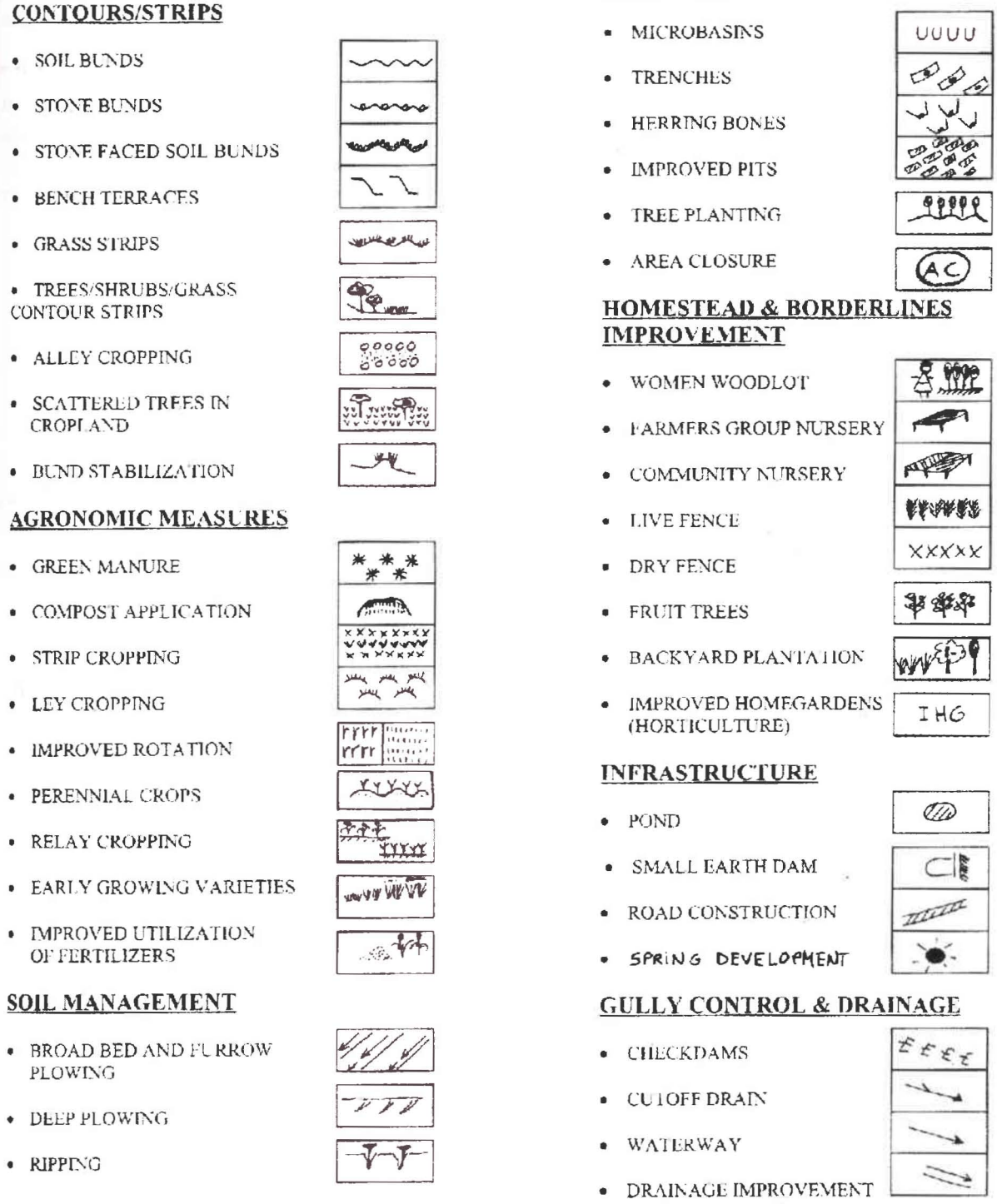


Figure 3.11 Example of symbols for the watershed development map



IN WHICH AGROCLIMATIC ZONE DO YOU WORK?

1. If you know the altitude and rainfall data, check the altitude on the left side and the rainfall on the bottom side of the Figure 3.12, then you can easily find in which agroclimatic zone your area is situated.

2. If you do not have altitude and rainfall data, you can find the box which best fits the local conditions of your area. Read the descriptions given in each box of Figure 3.12 and identify the agroclimatic zone in which your area is situated. You must emphasise the identification of the main crops (A) and natural trees (T). If you still have doubts consult the brown guideline by Hans Hurni (page 14-31) and the green guideline (page 96-114) for Development Agents.

Figure 3.12 A chart for selecting agroclimatic zones

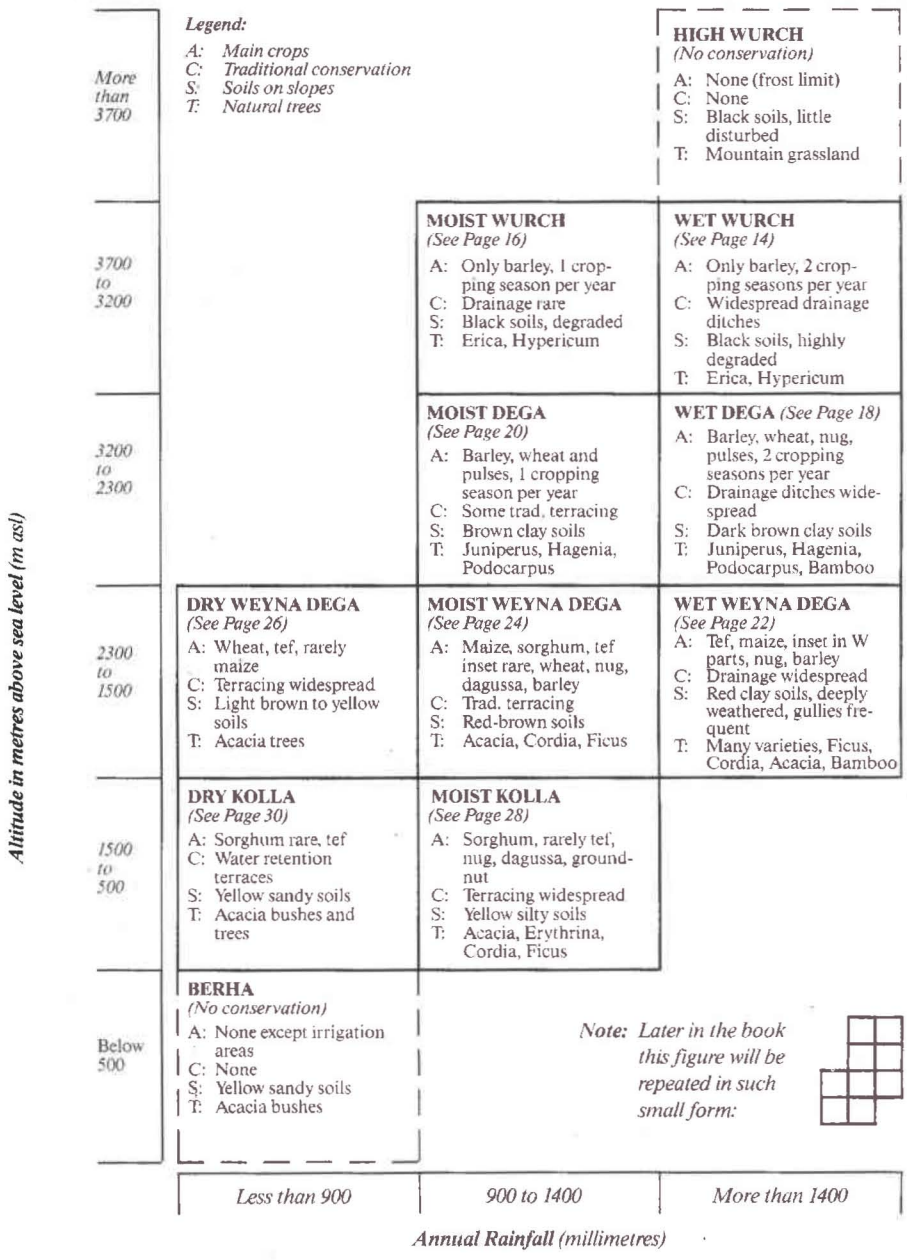


Figure: ***Description of agroclimatic zones of Ethiopia.***
On the vertical is the altitude, increasing upwards. On the lateral is the annual rainfall, increasing towards the right side. Each box represents one agroclimatic zone. Only the nine strongly marked boxes are used further in this book.

Annex 4
Simple Survey Methods

1 Marking Contour Lines With the Line Level

1.1 Definition

Contour lines are horizontal lines across the slope joining points of the same elevation. Contour lines are used to line out conservation measures which have to be level.

1.2 Materials

The following items are needed:

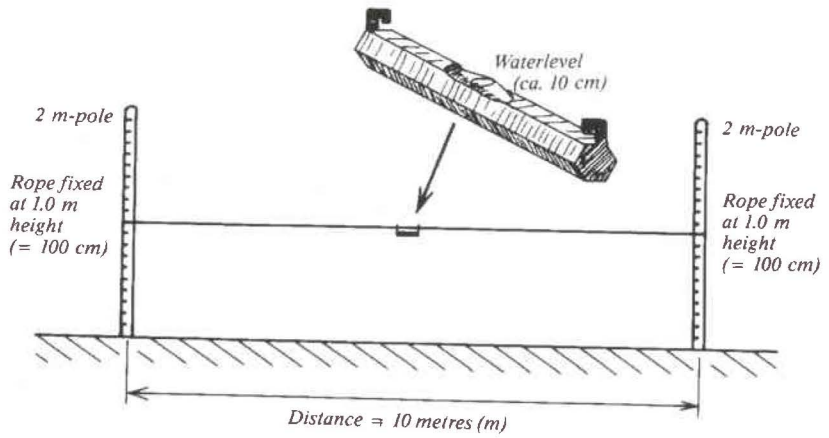
- Water-level
- Thin plastic rope, 11 m long
- 2 woodeen poles, 2 m long, marked every 10 cm
- Meter-band or meter-stick
- Short poles for marking the ground

1.3 Preparation

Fix the thin rope with each end to one wooden pole so that exactly 10 m of rope are between the poles. Check length regularly. Mark the middle of the rope at 5 m with knot. Hang the small water-level in the middle of the rope. Three to four people are needed to survey a level line and to mark it on the ground.

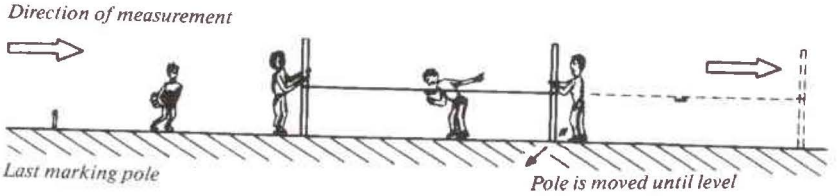
1.4 Marking contour lines

Proceed across the slope as shown in the drawing below. Survey 10 m at a time, in difficult topography only 5 m (half the rope)



d) Marking contour lines:

Proceed across the slope as shown in the drawing below. Survey 10 m at a time, in difficult topography only 5 m (half the rope).



2 Measuring Slope Gradients

a) Definition:

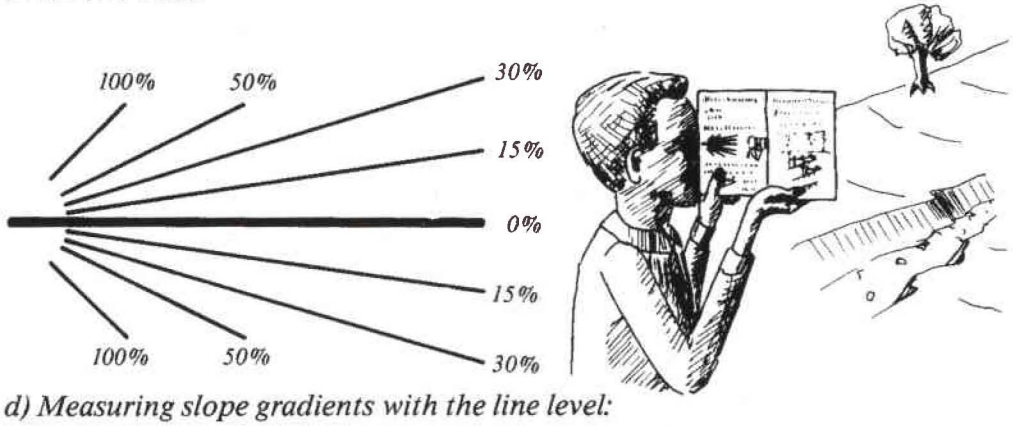
Slope gradient is the steepness of a slope. It is given as height in percentage of length (%) or in degree.

b) Materials:

The following items are needed:
- Waterlevel or this page of the book (see c) below)
- Thin plastic rope, 11 m long, meter band or meter stick
- 2 wooden poles, 2 m long, marked every 10 cm
- Small poles for marking on the ground

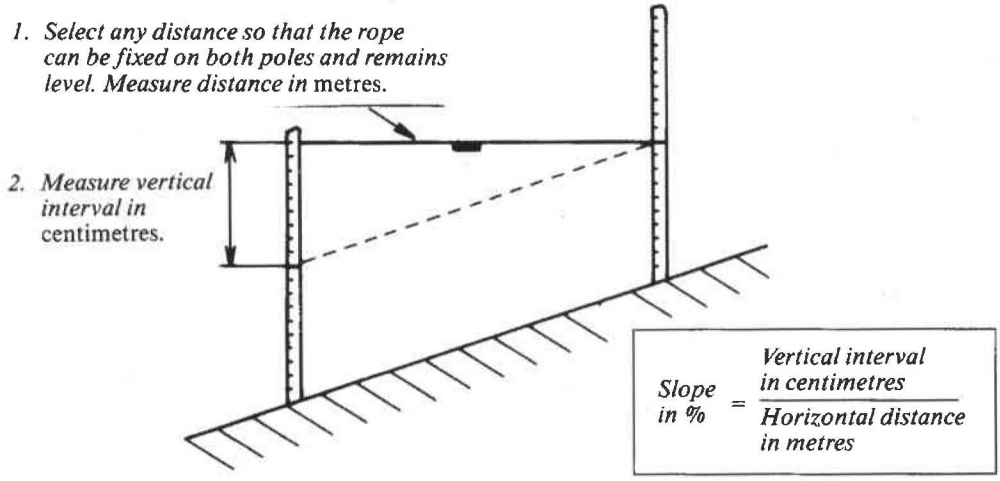
c) Estimating slope gradients with the figure below:

Hold the book horizontally as demonstrated (somebody may help you in checking) and look with one eye along the book upslope or downslope. Select the line that best fits the actual slope and read the percentage given or an estimation between two lines.



d) Measuring slope gradients with the line level:

Follow the steps given below and use the formula to calculate the slope percentage. Take care that you use the correct units (1 metre = 100 centimetres, cm)



$$\text{Slope in \%} = \frac{\text{Vertical interval in centimetres}}{\text{Horizontal distance in metres}}$$

3 Measuring Vertical Intervals with the Line Level

a) Definition:

A vertical interval between two points is the difference in elevation between them. Vertical intervals are used along the slope to mark the spacing between two conservation measures. Vertical intervals of structures on slopes steeper than 15% are calculated on the basis of the depth of soil observed on the slope.

b) Materials:

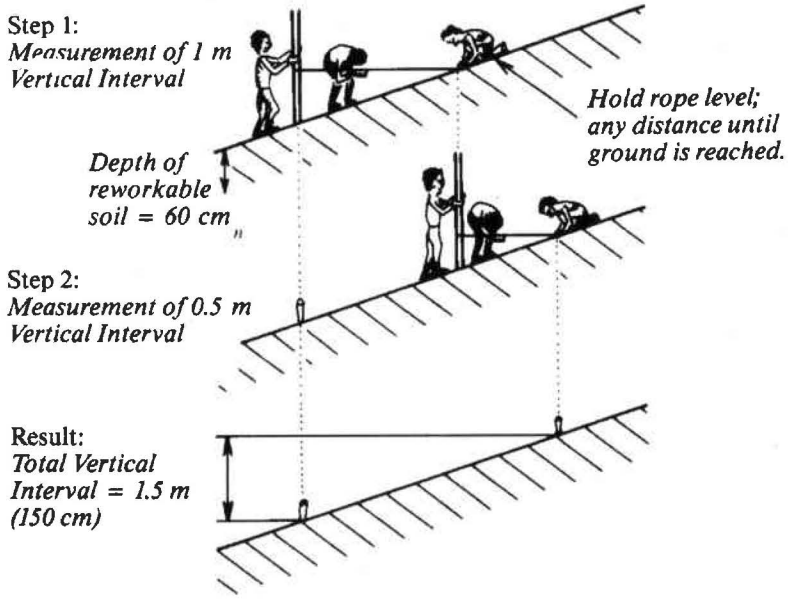
As 2(b) on page 38

c) Assessing the correct vertical interval:

- On slopes of less than 15% gradients (See page 38(C) for slope measurement), the vertical interval is 1 metre.
- On slopes of more than 15% gradients, the vertical interval is two and a half times the soil depth.
- Examples:

Slope (%)	Depth of Soil	Vertical Interval, m (cm)
5	(more than 50 cm)	1 m (= 100 cm)
10	(more than 50 cm)	1 m (= 100 cm)
18	60 cm (= 0.60 m)	1.50 m (= 150 cm)
25	80 cm (= 0.80 m)	2.00 m (= 200 cm)
35	50 cm (= 0.50 m)	1.25 m (= 125 cm)
45	25 cm (= 0.25 m)	0.62 m (= 62 cm)

c) Marking 1.5 m (150 cm) vertical interval:



4 Marking Graded Lines with the Line Level

a) Definition:

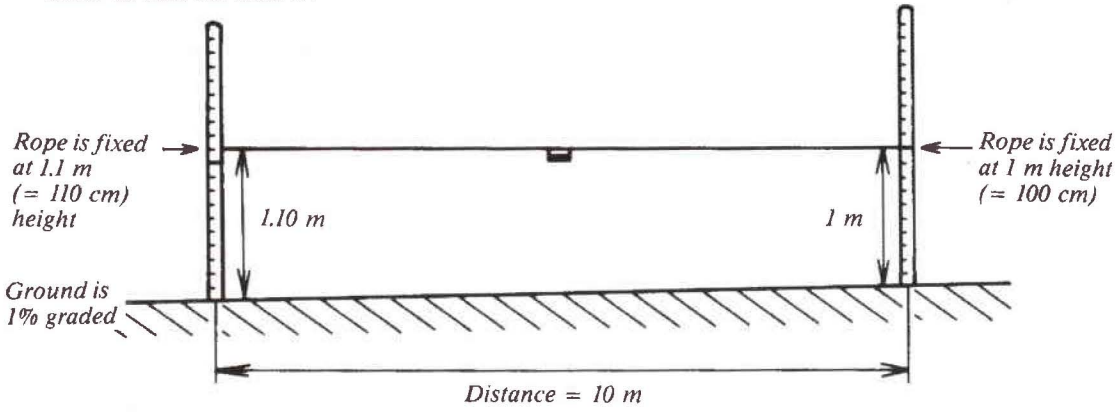
Graded lines are lines across the slope, which have a very small lateral gradient. They are used to line out conservation measures which are graded to drain excess water.

b) Materials:

As 2(b) on page 38

c) Preparation:

For lining out 1% graded measures, the line level also uses a difference of 1% over 10 m length. That means the rope has to be fixed on the poles with 10 cm difference as shown below:

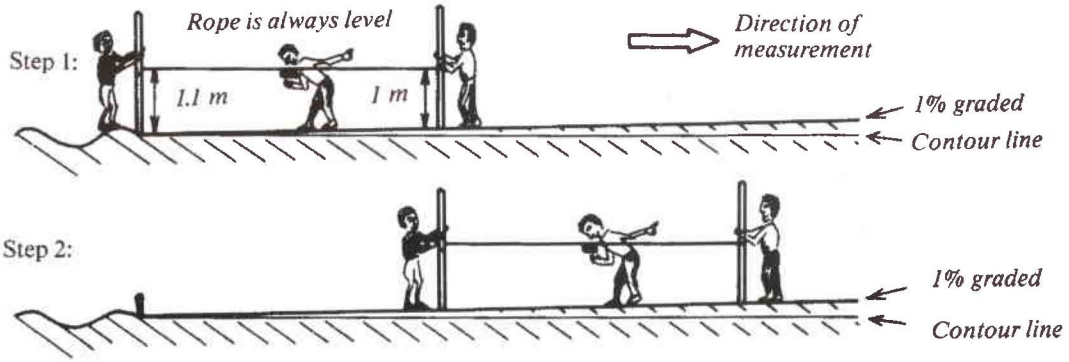


For lining out 2% graded measures, fix one end of the rope at 1.2 m (=120 cm) on the pole, and one end at 1 m (= 100 cm) to give a total difference of 20 cm over 10 m length.

For 0.5% graded measures, fix rope with 5 cm difference.

d) Marking 1% graded lines on ground:

Always start lining out at waterway or river and proceed slightly upslope (1%). Always use the pole with the rope fixed higher up, nearer to the waterway, and the pole with the rope fixed at 1 m, farther away, as shown below.



5 How to Identify the Texture of a Soil

a) Definition:

Soil texture is mainly concerned with the size and shape of the mineral particles of the soil. Particles are sand, silt and clay and they have the following diameters:

Sand: 0.05–2 mm (particles visible)
Silt: 0.002–0.05 mm (particles hardly visible)
Clay: less than 0.002 mm (particles not visible)

Clayey soils have more than 50% clay particles.
Silty soils have more than 50% silt particles.
Sandy soils have more than 50% sand particles.

Loams are soils with mixed particles of sand, silt and clay.

b) Significance of soil texture for soil conservation:

Soil erosion depends much on the infiltration rate of a soil. The infiltration rate again depends on the soil texture. In a sandy soil, the infiltration rate is higher than in a silty soil. In a clayey soil, it may be initially high (for heavy black clay with cracking), but becomes low when the soil is moist to wet. Other factors influencing the infiltration rate are soil structure, humus content, soil moisture, soil depth and soil surface roughness.

In moist agroclimatic zones, the decision for selecting graded or level structures on cultivated land mainly depends on the soil texture found on the slope where conservation is planned. For clayey soil, graded structures are recommended, because the infiltration in the basins is too slow. For silty to sandy soil, level structures are recommended because the water retained in the basins will infiltrate more quickly.

c) How to differentiate between clayey, silty and sandy soil:

1. Take a small handfull of fine earth from the slope.

2. Slowly add little amounts of water and mix it very well with the earth sample. Stop adding water as soon as the formed soil ball starts to stick to your hand.

3. The soil texture can be roughly estimated with your moist soil sample. Try to form the sample into the different shapes demonstrated on the next page. See how many of the pictures you can form with your soil. If you cannot form it any further, stop at the previous picture and read the soil texture on the right side. This is the texture of your soil.

Now proceed to the next page and start forming your soil sample following the pictures from top down.

d) Form your sample according to each picture below until the next one is no more possible:

1) The soil remains loose and single grained and can only be heaped into a pyramid:

Sand (1)

2) The soil contains sufficient silt and clay to become somewhat cohesive and can be shaped into a ball that easily falls apart:

Loamy sand (2)

3) The soil can be rolled into a short thick cylinder:

Silt loam (3)

4) The soil can be rolled into a cylinder of about 15 cm length:

Loam (4)

5) The soil can be bent into a U:

Clay loam (5)

6) The soil can be bent into a circle that shows cracks:

Light clay (6)

7) The soil can be bent into a circle without showing cracks:

Heavy clay (7)

Note: Texture classes (1) to (4) are *sandy to silty soils* which have generally good infiltration. Texture classes (5) to (7) are *clayey soils* which have generally poor infiltration.

Annex 5
Intervention and Their Suitability

I Intervention Areas: Description of Measures and Specific Technologies

The measures listed below are placed indicatively based upon the main agroclimatic conditions and land use. This categorization is indicative as several measures have multiple functions (for instance, both for forestry and fodder, for water harvesting and conservation, for soil fertility improvement and moisture conservation, and the like). However, for practical reasons they are divided mostly based on their primary or most relevant function. Detailed information on the basic measures is included in Section (B) of Part 1: *Community-based Participatory Watershed Development: A Guideline.*

Tables 5.1 to 5.7 provide only broad indication of suitability. The DA and the CWT need to consult detail information kits about each measure and check its suitability based on specific site conditions, mainly slope, soil depth, vegetation cover, cropping patterns and erosion levels.

Table 5.1 Physical soil and water conservation (SWC) measures

SR	Measure and work norm (MoA - 2000)	Main land use (*)	Suitability based on agro-ecology		
			Arid (*Kolla*) up to 500 mm	Semi-arid (dry *weyna dega*) 500-900 mm	Medium/high rainfall areas (*weyna dega*/ *dega*) >900 mm
1	**Soil bunds** Work norm: 150 PD/km	Cu, Hcu, Gr	Suitable with large trenches	Suitable with trenches	In *dega* may need to be graded
2	**Stone bunds** Work norm: 250 PD/km	Cu, Hcu, Gr, FrSr, Ms	Same as above	Suitable +/- trenches	Suitable without soil fill on upper side of bund
3	**Stone faced soil bunds** Work norm: 250PD/km	Cu, Hcu, Gr, FrSr, Ms	Suitable with trenches	Suitable +/- trenches	In *dega* may need to be graded
4	**Fanya juu bunds** Work norm: 200 PD/km	Cu, Hcu, Gr	Not suitable	Suitable +/- alternate with trench soil bunds	Suitable in deep soils (>100 cm) – may be graded in *dega* zone
5	**Bench terraces** Work norm: 500 PD/km	Cu, Gr	Suitable with runon/ runoff system	Suitable	Suitable +/- may need excess water disposal structures

(*) Cu: cultivated land; HCu: Homesteads; Gr: Grazing lands; FrSr: forest/scrub land (usually steep slopes); Gu: Gully land, Ms (miscellaneous-degraded areas under multiple uses)

Table 5.2 Flood control and drainage

SR	Measure and work norm (MoA - 2000)	Main land use (*)	Suitability Based On Agroecology		
			Arid (Kolla) up to 500 mm	Semi-arid (dry weyna dega) 500-900 mm	Medium/high rainfall areas (weyna dega/ dega) >900 mm
1	**Rock catchment water harvesting – runoff farming and ponding** Work norm: person days based on different activities	Based on site – below rock outcrops	Suitable	Suitable	Partially Suitable (specif conditions only)
2	Cutoff drains Work norm: 0.7 m³/PD	Based on site, below FsSr	Suitable	Suitable	Suitable
3	**Vegetative waterway** Work norm: 1m³/PD	Cu, Gr	Not suitable	Suitable combined with drop/apron structures	Suitable
4	**Stone paved waterway** Work norm: 0.75 m³/PD	Cu, Gr	Suitable	Suitable	Suitable
5	**Waterway Check & Drop + Apron structure (CDA)** Work norm: 3 CDA/PD	Support waterway construction	Suitable	Suitable	Suitable
6	**Flood water diversion using spreading bunds** Work norm: based on activities	Based on site	Suitable	Not Suitable	Not suitable
7	**Vertisols management – BBM (Broaded and furrow maker)** Work norm: not applicable (see requirements in Infotech)	Cu	Not suitable	Not suitable	Suitable (> 1000 mm rain – flat or slopes < 2% terrains)

(*) Cu: cultivated land; HCu: Homesteads; Gr: Grazing lands; FrSr: forest/scrub land (usually steep slopes); Gu: Gully land, Ms (miscellaneous-degraded areas under multiple uses)

Table 5.3 Water harvesting and runoff management for multiple uses and irrigation

SR	Measure and work norm (MoA - 2000)	Main land use (*)	Suitability based on agroecology		
			Arid (Kolla) up to 500 mm	Semi-arid (dry weyna dega) 500-900 mm	Medium/high rainfall areas (weyna dega/ dega) >900 mm
1	**Hand-dug shallow wells** Work norm: person days based on excavation, stone collection, and others.	Hcu, Cu, and Gu (below SS dams)	Suitable	Suitable	Suitable
2	**Low cost micro-ponds 60-150 m³)** Work norm: person days same as ponds	Hcu, Cu	Partially suitable	Suitable	Partially suitable
3	**Underground cisterns (20-40 m³)** Work norm: person days based upon soil excavation, lifting, and others.	HCu	Partially suitable (rare to find suitable soils)	Suitable	Suitable
4	**Percolation pits** Work norm: person days	Below FsSr, Ms	Suitable	Suitable	Suitable
5	**Pond (1500 – max. 5000 m³)** Work norm: 0.5 m³/PD	Based on site	Suitable (with preferred depth > 5 meters and seepage control)	Suitable	Suitable
6	**Spring development** Work norm: 1700 PD/spring	Gu, below FsGr	Suitable	Suitable	Suitable
7	**Roof water harvesting** Work norm: person days	Schools, buildings, and others	Suitable	Suitable	Suitable
8	**River bed dams** Work norm: person days for trench excavation, lining, filling	Based on site	Suitable (specific sites only)	Suitable (specific sites only)	Not suitable
8	**Stream diversion weir** Work norm: 3000 PD/weir	Based on site	Suitable	Suitable	Suitable
9	**Farm dam (min 5000 m³ and max 50,000 m³)** Work norm: 0.4 m³/PD	Based on site	Suitable	Suitable	Suitable
10	**Stone faced/soil or stone bunds with run-off/run-on areas** Work norms: same as for bunds	Cu, Gr, Ms	Suitable**	Not suitable	Not suitable
11	**Conservation bench terraces with runoff/runon areas** Work norm: same as bench terr.	Cu, Hcu	Suitable in areas with good soils	Suitable only for high value crops	Not suitable
12	**Tie ridges** Work norm: not applicable	Cu, Hcu	Suitable (slopes < 3%)	Suitable for specific crops	Not suitable
13	**Inter-row water harvesting** Work norm: person days	Cu, Hcu	Suitable for high value crops	Not suitable	Not suitable
14	**The zaï & planting pit system** Work norm: 1 PD/50 zaï pits	Ms, Gr	Suitable**	Not suitable	Not suitable
15	**Large half-moon structures staggered alternatively** Work norm: same as soil bund	Cu, Gr, Ms	Suitable **	Not suitable	Not suitable

(*) Cu: *cultivated land; HCu: Homesteads; Gr: Grazing lands; FrSr: forest/scrub land (usually steep slopes); Gu: Gully land, Ms (miscellaneous-degraded areas under multiple uses)*

***This is a reclamation activity* – applicable also in pastoral contexts

Table 5.4 Soil fertility management and biological soil conservation

SR	Measure and work norm (MoA - 2000)	Main land use (*)	Suitability based on agroecology		
			Arid (*Kolla*) up to 500 mm	Semi-arid (dry *weyna dega*) 500-900 mm	Medium/high rainfall areas (*weyna dega dega*) >900 mm
1	**Contour cultivation** Work norm: not applicable	Cu, Hcu	Suitable with SWC measures and tie ridges	Suitable with SWC measures	Partially Suitable (specific soil conditions only)
2	**Compost making** Work norm: 10 PD/pit or 1 PD per linear meter (heap)	Hcu, Cu, Ms	Suitable (pit method) mostly around homesteads only	Suitable (pit method)	Suitable (pit or heap method)
3	**Efficient use of fertilizers** Work norm: not applicable	Cu, Hcu	Suitable only if integrated with additional water supply and conservation	Suitable only if integrated with additional water supply and conservation	Suitable if integrated with conservation, drainage control and the like.
4	**Grass strips along the contours** Work norm: 30 PD/km	Cu, Hcu	Generally not suitable	Suitable only with drought resistant species and/or combined with conservation structures	Suitable
5	**Stabilization of physical structures** Work norm: 30 PD/km	Cu, Hcu, FrSr, Gr	Suitable with very drought resistant species	Suitable with drought resistant species	Suitable
6	**Vegetative fencing & stabilization (closures, gullies and farm boundaries)** Work norm: 40 PD/km	Ms, FrSr, Cu, Gu	Suitable with drought resistant species and support structures	Suitable	Suitable
7	**Strip cropping** Work norm: not applicable	Cu, Hcu	Suitable (supplemented by irrigation)	Suitable in benched areas	Suitable
8	**Ley cropping** Work norm: not applicable	Cu, Hcu	Not suitable	Suitable in fallows within areas treated with SWC measures	Suitable in fallows within areas treated with SWC and drainage measures
9	**Cover/green manure crops** Work norm: not applicable	Cu, Hcu	Suitable with drought tolerant legume crops	Suitable	Suitable
10	**Intercropping** Work norm: not applicable	Cu, Hcu	Suitable	Suitable	Suitable
11	**Sequential cropping using food crop** Work norm: not applicable	Cu, Hcu	Not suitable	Suitable for specific soils and with SWC	Suitable (specific soils and with SWC and drainage)
12	**Cropping using forage crops followed by food crops** Work norm: not applicable	Cu, Hcu	Not suitable		
13	**Relay cropping** Work norm: not applicable	Cu, Hcu	Not suitable unless under irrigation	Suitable	Suitable
14	**Mulching & crop residues management** Work norm: 250 PD/ha	Cu, Hcu	Suitable (mostly around homesteads)	Suitable (mostly around home-steads) and along conservation structures + compost	Suitable
15	**Crop rotation** Work norm: not applicable	Cu, Hcu	**Suitable (crops with different rooting zones) combined with SWC** and/or irrigation	Suitable	Suitable
16	**Choice of crops and plant population density** Work norm: not applicable	Cu, Hcu	Suitable (with SWC measures and based on moisture levels)	Suitable (with SWC measures and based on moisture levels)	Suitable (with SWC measures and drainage)
17	**Improved fallowing** Work norm: not applicable	Cu, Hcu, Gr	Generally not suitable	Suitable with other measures	Suitable
18	**Homestead technology (*)** Work norm: based on measures	HCu	Suitable (integrated with water harvesting and conservation measures)	Suitable (integrated with water harvesting and conservation measures)	Suitable (integrated with water harvesting and conservation measures/drainage measures

(*) Cu: cultivated land; HCu: Homesteads; Gr: Grazing lands; FrSr: forest/scrub land (usually steep slopes); Gu: Gully land, Ms (miscellaneous-degraded areas under multiple uses)

Table 5.5 Agro-forestry, forage development and forestry (community/group/private)

SR	Measure and work norm (MoA - 2000)	Main land use (*)	SUITABILITY BASED ON AGROECOLOGY		
			Arid (*Kolla*) up to 500 mm	Semi-arid (dry *weyna dega*) 500-900 mm	Medium/high rainfall areas (*weyna dega*/ *dega*) >900 mm
(A) Physical measures for tree/fodder/multipurpose species planting					
1	**Trenches** Work norm: 2PD/3 trenches	FrSr, Hcu, Ms	Suitable	Suitable	Partially Suitable (shallow soils/steep slopes only)
2	**Microbasins (MB)** Work norm: 1PD/5 MB	FrSr, Hcu, Ms	Not suitable	Partially suitable	Suitable
3	**Eyebrow basins (EB)** Work norm: 1 PD/2 EB	FrSr, Hcu, Ms	Suitable	Suitable	Suitable (shallow and stony soils)
4	**Herring bones (HB)** Work norm: 1PD/4 HB	FrSr, Hcu, Ms	Suitable	Suitable (<5% slope)	Suitable (<5% slope)
5	**Micro-trenches (MT)** Work norm: 1PD/3 MT	FrSr, Hcu, Ms	Not suitable	Suitable	Suitable
6	**Improved pits (IP)** Work norm: 1 PD/5 IP	FrSr, Hcu, Ms	Not suitable	Suitable	Suitable
7	**Hillside terraces** Work norm: 250 PD/km	FrSr, Gr, Ms	Not suitable	Suitable	Suitable
8	**Hillside terraces + trenches** Work norm: 330 PD/km	FrSr, Gr, Ms	Suitable	Suitable	Suitable in shallow soils (flood control)
9	**Half moon structures (HM)** Work norm: 1PD/ 4 HM	FrSr, Hcu, Ms	Suitable (sandy soils, <5%slope)	Suitable (<5% slope, sandy soils)	Not Suitable
(B) Vegetative measures					
10	**Alley cropping and improved hedgerows** Work norm: 10 PD/km	Cu, HCu	Not suitable	Suitable if supported by other biological measures	Suitable
11	**Multi-storey gardening** Work norm: person days	Hcu, Cu	Suitable only if supported with SWC measures	Suitable +/- SWC measures	Suitable
12	**Trees/shrubs/grass hedgerows** Work norm: as vegetative fencing	FrSr, Gr, Cu, Hcu	Same as above	Same as above	Same as above
13	**Area closure** Work norm: 4 PD/Ha/year	FsSr, Ms, Gu	Suitable only if supported by physical structures	Suitable only if supported by physical structures	Suitable and enhanced by SWC measures
14	**Small soil or stone faced/soil level bunds using runoff/runon areas** Work norm: soil or stone bunds norm divided by half	Gr, Ms	Suitable (applicable for pastoral areas)	Suitable in shallow soils and high value fodder species	Not suitable
15	**Narrow stone lines (staggered alternatively)** Work norm: stone collection work norm (0.5 m^3/PD)		Suitable (applicable for pastoral areas)	Not suitable	Not suitable
16	**Large half-moon structures (staggered alternatively)** Work norm: soil bund norm divided by half	Gr, Ms	Suitable (applicable for pastoral areas)	Not suitable	Not suitable

(*) Cu: cultivated land; HCu: Homesteads; Gr: Grazing lands; FrSr: forest/scrub land (usually steep slopes); Gu: Gully land, Ms (miscellaneous-degraded areas under multiple uses)

Table 5.6 Gully control

SR	Measure and work norm (MoA - 2000)	Main land use (*)	Suitability based on agroecology		
			Arid (*Kolla*) up to 500 mm	Semi-arid (dry *weyna dega*) 500-900 mm	Medium/high rainfall areas (*weyna dega*/ *dega*) >900 mm
1	**Stone checkdams** Work norm: 0.5 m³/PD	Gu crossing various land uses	Suitable	Suitable	Suitable
2	**Brushwood checkdams** Work norm: 1 PD/3 linear meters	Same as above	Suitable only with dry resistant species combined with physical checkdam	Suitable	Suitable
3	**Gully cut/reshaping & filling** Work norm: 1m³/PD of earth cut and filling	Same as above	Suitable	Suitable	Suitable
4	**Gully revegetation** Work norm: 500 PD/ha	Same as above	Suitable with drought resistant tree/shrubs and SWC structures	Suitable with SWC structures	Suitable
5	**Soil Storage overflow dams (SS dams)** Work norm: (1) 0.75 m³/PD for earth and stone movement, excavation, filling (2) 0.5 m³/PD for spillway construction	Same as above	Suitable	Suitable	Suitable
6	**Soil Storage overflow bunds (SS bunds)** Work norm: 0.5 m³/PD for earth movement and spillway construction + work norm of brushwood for consolidation	Same as above	Suitable (smaller gullies than above)	Suitable (smaller gullies than above)	Suitable (smaller gullies than above)

(*) Cu: cultivated land; HCu: Homesteads; Gr: Grazing lands; FrSr: forest/scrub land (usually steep slopes); Gu: Gully land, Ms (miscellaneous-degraded areas under multiple uses)

Table 5.7 Feeder roads

SR	Measure and work norm (MoA - 2000)	Main land use (*)	Suitability based on agroecology		
			Arid (*Kolla*) upto 500 mm	Semi-arid (dry *weyna dega*) 500-900 mm	Medium/high rainfall areas (*weyna dega*/ *dega*) >900 mm
1	**Feeder roads (unpaved)** Work norm: 3000 PD/km	Based on site conditions	Suitable based on type of road and site conditions	Suitable based on type of road and site conditions	Suitable based on type of road and site conditions
2	**Feeder roads (paved)** Work norm: 4000 PD/km	Based on site conditions	Suitable based on type of road and site conditions	Suitable based on type of road and site conditions	Suitable based on type of road and site conditions

(*) Cu: cultivated land; HCu: Homesteads; Gr: Grazing lands; FrSr: forest/scrub land (usually steep slopes); Gu: Gully land, Ms (miscellaneous-degraded areas under multiple uses)

Other measures

A number of supplementary measures are also included in the work norms manual (MoA-WFP, 2000) that strengthen and/or support some of the measures indicated above. For example, stone collection and stone facing, mulching and manuring of plantation pits, tree seed collection and grass seed collection, and the like. The supplementary measures are often the reason for success of other measures as they provide the means to apply reinforcements and/or additional fertility to planted areas.

Annex 6
Summary of National Work Norms

I Year 2000 Revised Soil and Water Conservation and Specific Community Work Norm Activities

1.1 Standard work norms

For each activity, minimum technical standards and work norm elements are developed (Work Norm Guideline – 2000). A first set of work norms is included in Table 6.1 and refer to activities that were also implemented prior year 2000 and reviewed by the regions through a comprehensive field testing exercise. These norms have been shared and endorsed by MoA in year 2000 through a national workshop and review process. Additional work norms have been developed as "Interim Work Norms" for a new set of measures and technologies thought to complement the first set and meet specific regional demands.

All measures include **technical standards,** which are key technical requirements related to the dimensions, size, spacing, and others, required for each activity currently supported by the project and **work norm elements,** which refer to the main operations necessary to accomplish a given measure. For additional information (figures, drawings, photographs, and others.), experts should refer to the infotechs attached in Part 1 of *Community-based Participatory Watershed Development: A Guideline* as well as other technical manuals and training documents.

Table 6.1 The revised and final set of work norms

No.	Activity	Unit	Revised norms
Activities for which work norms are revised and changed			
1	Soil bund	PD/km	150PD/km
2	Stone bund	PD/km	250PD/km
3	Fanya-juu	PD/km	200PD/km
4	Planting on bund	PD/km	16PD/km
5	Hillside terracing	PD/k	250PD/km
6	Cut-off drain construction	M^3/PD	0.70 M^3/PD
7	Grassed waterway construction	M^3/PD	1.0 M^3/PD
8	Bench terrace construction	PD/km	500PD/km
9	Stone check-dam construction	M^3/PD	0.5 M^3/PD
10	Stone check-dam maintenance	M^3/PD	1 M^3/PD
11	Seedling production	PD/1000 seedling	15PD/1000
12	Pitting	PD/pits	1PD/15 Pits
13	Micro-basin construction	PD/micro-basins	1PD/5MB
14	Seed collection (*)	PD/kg	20PD/kg
15	Seedling planting	PD/Plants	1PD/50 plants
16	Site guarding	PD/Ha./year	4PD/ha/year
17	Small farm dam construction	M^3/PD	0.4 M^3/PD
18	Pond construction	M^3/PD	0.5M^3/PD
19	Farm road construction	PD/km	3000PD/km
20	Road maintenance/construction on <5% slope	PD/Km	500PD/km
Measures for which work norm is not yet revised or changed			
21	Spring development	No	1700 PD/spring
22	Stream diversion weir	No	3000 PD/weir
23	Grass and legume seed production (multiplication center)	*No*	700 PD/ha/year
Measure excluded from ffw (no norms applicable)			
24	Bund maintenance	-	Self-help
25	Other structures/assets maintenance	-	Self-help

(*) Seed collection has a different specific norm (60 PDs/kg) for Grevillea robusta seeds only (applicable under MERET project framework only).

1.2 New activities and interim work norms

The new interim work norms are provided for the following activities / measures:

- **Activities already tested and implemented in various regions but without regular work norms:** for example stone faced soil bunds, live fencing, planting grass on bunds, brushwood check dams, stone surfaced feeder roads, and the like.).
- **Activities tested after training courses and study tours and proved to be valid and/or of high potential for introduction and replication at large scale:** for example trenches for tree planting, improved hillsides + trenches, stone paved waterways, gully cut and fill + revegetation, and others.
- **Activities of recent introduction and tested but of high potential under Ethiopian conditions:** for example herring bones, eyebrow terraces (large micro-basins), spillways on terraces, soil storage and overflow dams (SS dams), mulching of tree planting, and others.
- **Activity support measures or measures required to supplement others:** for example drop and aprons, stone collection, stone shaping, grass seed collection, and others.
- The interim work norms are still provisional norms because not all regions and *weredas* have widely tested the new activities. The first list of interim work norms was produced in the Year 2000.

The activities listed in Table 6.2 allow countless combinations amongst themselves and with the ones of Table 6.1. They have designs that can be changed to accommodate specific soil, topographic, productivity and local needs. For instance, for a trench over half a dozen designs can be made based on the type of crops and trees to grow.

Table 6.2 Summary of suggested work norms

	Activities	Work norm (interim)
I.	**Soil and water conservation**	
1	Bunds stone spillway + apron	2 PD/1 spill way + apron
2	Bund stabilization (grasses and legumes)	30 PD/km
3	Hillside terrace + trench construction	330 PD/km
4	Waterway construction (stone paved)	1 PD/0,75 m^3 earth/stone work
5	Waterway check and drop + apron structure (CDA)	1 PD/ 3 CDA
6	Brushwood checkdams construction	1 PD/3 linear meters
7	Stone faced/soil bunds construction	250 PD/km
8	Gully re-vegetation	500 PD/ha
9	Sediment storage dam (SS dam)	1 PD/0,75 m^3 earth/stone work
10	SS dams spillway construction	1 PD/0.5 m^3 spillway
11	Gully cut and fill/reshaping/leveling	1 PD/1 m^3 earth work
12	Compost making (Pit: 4mL x 2mW x 1.5mD)	10 PD/pit
13	Compost making (heap: 4mL x 2mW x1.5mD)	1 PD/linear meter
14	Eyebrow basin construction (EB)	1 PD/2 EB
15	Trench construction	2 PD/3 trenches
16	Herring bone construction (HB)	1 PD/4 HB
17	Improved pits for dry areas	1 PD/5 Improved pits
18	Micro-trenches	1 PD/3 micro-trenches
19	Mulching of trenches / eyebrow basins / herring bones, and others	1 PD/50 structures
20	Alley cropping	10 PD/km
21	Mulching of degraded land and long fallows	250 PD/ha
22	Zai pits	1 PD/50 pits
23	Grass strips	30 PD/km
24	Grassland improvement	20 PD/ha/year
II.	**Infrastructure**	
25	Road Construction (Type 2 – surfaced/paved)	4000 Pd/km
iii.	***Supplementary measures***	
26	Manuring of planting pits	1 PD/200 pits
27	Cow dung collection and distribution	6 PD/ 1 m^3
28	Grass seeds collection (area closures, bunds, etc)	10 PD/kg
29	Gabion structure	1PD/0.25 m^3 of gabion check
30	Vegetative fencing and stabilization	40 PD/km
31	Stone shaping (SS and rockfill dam walls, large gully checks)	1 PD/0.5 m^3 shaped stones
32	Stone collection and transport	1 PD/0.5 m^3 transp. to site

Annex 7
List of Useful Plant Species

Table 7.1 Suitable tree/shrub species in the three agro-ecological zones

No	Species	Agro-ecological zone		
		Dega	*Weyna Dega*	*Kolla*
1.	*Acacia abyssinica*	✓		
2.	*Acacia albida (Faidherbia albida)*		✓	
3.	*Acacia decurrens*	✓	✓	
4.	*Acacia meamsii*	✓	✓	
5.	*Acacia melanoxylon*	✓		
6.	*Acacia nilotica*			✓
7.	*Acacia saligna*		✓	✓
8.	*Acacia senegal*			✓
9.	*Acacia seyal*		✓	
10.	*Acacia tortolis*		✓	
11.	*Albizia gummifera*		✓	
12.	*Albizia lebbeck*			✓
13.	*Annona senegalensis*			✓
14.	*Arundinaria alpina*	✓		
15.	*Arundo donax*		✓	✓
16.	*Azadirachta indica*		✓	✓
17.	*Balanites aegyptiaca*			✓
18.	*Boswellia papyrifera*			✓
19.	*Cajanus cajan*	✓	✓	✓
20.	*Cassia siamea*			✓
21.	*Casuarina equisetifolia*	✓	✓	✓
22.	*Chamaecytisus palmensis*	✓	✓	
23.	*Cordia africana*		✓	
24.	*Croton macrostachyus*	✓	✓	✓
25.	*Cupressus lusitanica*	✓	✓	
26.	*Dodonaea angustifolia*			✓
27.	*Ensete ventricosum*	✓		
28.	*Erythrina brucei*		✓	✓
29.	*Eucalyptus camaldulensis*		✓	✓
30.	*Eucalyptus globullus*	✓	✓	
31.	*Eucalyptus saligna*		✓	✓
32.	*Grevillea robusta*	✓	✓	
33.	*Hagenia abyssinica*	✓	✓	
34.	*Juniperus Procera*	✓	✓	
35.	*Leucaena leucocephala*		✓	✓
36.	*Melia azedarach*		✓	✓
37.	*Millettia ferruginea*	✓	✓	✓
38.	*Moringa oleifera*		✓	✓
39.	*Moringa stenopetala*		✓	✓
40.	*Olea europaea*	✓	✓	
41.	*Oxytenanthera abyssinica*			✓
42.	*Parkinsonia aculeata*		✓	✓
43.	*Podocarpus falcatus*	✓	✓	
44.	*Prosopis juliflora*		✓	✓
45.	*Rhamnus prinoides*	✓	✓	✓
46.	*Schinus molle*	✓	✓	✓
47.	*Sesbania sesban*		✓	✓
48.	*Syzygium guineense*		✓	✓
49.	*Tamarindus indica*		✓	✓
50.	*Terminalia brownii*		✓	✓
51.	*Ziziphus mauritiana*		✓	✓
52.	*Ziziphus spina-christi*			✓

The symbol (✓) shows that the particular species is suitable for the designated agro-ecological zone.

Table 7.2 Suitable fruit tree species in the three agro-ecological zones

No	Species	Agro-ecological zone		
		Dega	*Weyna Dega*	*Kolla*
1	*Annona senegalensis*		✓	✓
2	*Carica papaya*		✓	✓
3	*Citrus aurantifolia*		✓	✓
4	*Citrus lemon*		✓	✓
5	*Citrus medica*		✓	✓
6	*Citrus reticulata*		✓	✓
7	*Citrus sinensis*		✓	✓
8	*Malus sylvestris*	✓		
9	*Mangifera indica*		✓	✓
10	*Persea americana*		✓	✓
11	*Prunus persica*	✓	✓	
12	*Prunus salicana*	✓	✓	
13	*Psidium guajava*		✓	✓

The symbol (✓) shows that the particular species is suitable for the designated agro-ecological zone.

Table 7.3 Suitable pasture species in the three agro-ecological zones

No	Species	Agro-ecological zone		
		Dega	*Weyna Dega*	*Kolla*
	Grasses			
1	*Avena sativa*	✓	✓	
2	*Choloris gayana*		✓	✓
3	*Cinchrus ciliaris*		✓	✓
4	*Dactylis glomerata*	✓	✓	
5	*Panicum maximum*		✓	✓
6	*Pennisetum purpureum*		✓	✓
7	*Phalaris aquatica*	✓	✓	
8	*Setaria anceps*		✓	✓
	Legumes			
1	*Beta Vulgaris*	✓	✓	
2	*Cajanus cajan*	✓	✓	✓
3	*Desmodium uncinatum*		✓	✓
4	*Lablab purpureus*		✓	✓
5	*Macroptilium atropurpureum*		✓	✓
6	*Staylosanthes guinanensis*		✓	✓
7	*Staylosanthes hamata*		✓	✓
8	*Trifolium* species	✓	✓	
9	*Vicia dasycarpa*	✓	✓	

The symbol(✓) shows that the particular species is suitable for the designated agro-ecological zone.

Table 7.4 Suitable horticulture/cash crops in the three agro-ecological zones

No	Species	Agro-ecological zone		
		Dega	*Weyna Dega*	*Kolla*
1	*Allium porrum*	✓	✓	
2	*Allium cepa*	✓	✓	✓
3	*Beta vulgaris*	✓	✓	✓
4	*Brassica oleracea*	✓	✓	✓
5	*Daucus carrota*	✓	✓	✓
6	*Lycopersicon esculentum*		✓	✓
7	*Solanum tuberosum*	✓	✓	
8	*Ipomoea batatas*		✓	✓

The symbol(✓) shows that the particular species is suitable for the designated agro/ecological zone.

Table 7.5 Characteristics of commonly planted tree species

Species	*Characteristics*
Acacia albida	" The" agroforestry tree of West Africa. Genuinely multipurpose. Pods for fodder. Needs water-table. Slow at first.
Acacia nilotica	Widespread in India and Africa. Likes deep soils and water-table. Good fuel/fodder. Fast grower.
Acacia saligna	Introduced species from Australia. For dune fixaaation/fodder/windbreaks. Hardy. Fast growing.
Acacia senegal	" Gum arabic" tree producing commercial gum. Good also for fuelwood/fodder. Direct seeding possible. Slow growing.
Acacia seyal	Likes low lying areas with heavy soils which flood. Good forage/fuelwood. Quite fast early growth.
Acacia tortilis	"Umbrella thorn". Good fuelwood and charcoal. Branches for fencing. pods good fodder. Fast once established.
Albizia lebek	From India. Small shade/amenity tree in Sahel. Needs high water-table. Foliage for mulch. Rapid growth.
Azadirachata indica	Neem treee: from India/Burma. Grown mainly for shade but is also good fodder/fuel. Fast growing.
Balanites aegyptiaca	"Desert date" widespread and-ecologically: "flexible". Fodder/edible fruit. Direct seeding possible. Slow growing.
Cassia siamea	Grown for shade, amenity, fuelwood and poles. Better with higher rainfall. Direct seeding possible. Quick growing.
Casuarina equisetifolia	Good on deep sands (also at coasts) so used for dune stabilization. Also fuelwood. Fast growing.
Colopphosperum mopane	Indigenous to southern Africa. Poles for construction and leaves for fodder. Firewood. Wood is very hard.
Eucalyptus camaldulensis	From Australia. Best eucalyptus for dry areas. Coppioes well. Windbreak/fuelwood. Very quick growing.
Prosopis chilensis	Similar to, and often confused with, *P.Juliflora*, see below.
Prosopis cineraria	Indigenous to NW India where grown as agroftorestry tree. Fodder/fuel building materials, Slow growing.
Prosoppis julliflora	Very drought resistant and establishes naturally. May invade potential areas. Coppices well. Good for fuel supply. Pods are used for fodder. Quick growth.
Ziziphus mauritiana	"Jujube". produces edible fruit. Can be grafted. Small tree. Branches for fencing. Slow growth.

Table 7.6 List of tree species and their uses

Species	Wood								Food							Fodder		Environmental
	Fire wood	Charcoal	Timber/Furniture	Poles/Posts	Flooring	Veneer/Plywood	Tool Handles	Carvings/Utensils	Boat Buildinbg	Fruit/Food	Vegetable	Seasoning	Drink/Soup	Oil/Edible gum	Jam/Syrup	Medicine	Fodder	Bee forage	Shade
Acacia abyssinica	x	x		x												x	x	x	x
Acacia nilotica	x	x		x			x	x								x	x	x	
Albizia gummifera	x		x					x	x							x		x	x
Azadirachta indica	x	x	x	x										x		x	x	x	x
Buddleja polystachya	x	x	x	x													x		
Bridelia micrantha	x	x	x	x			x			x						x	x		x
Carissa endulis	x									x		x	x			x			
Casuarina equisetifolia	x	x	x	x			x		x								x		
Cordia africana	x		x					x		x						x		x	x
Croton macrostachyus	x	x	x	x			x									x	x	x	
Cupressus lusitanica	x		x	x															x
Dovyalis caffra										x					x		x	x	
Erythrina abyssinica	x							x								x	x	x	
Eucalyptus camaldulenais	x	x	x	x													x	x	x
Eucalyptus citriodora	x		x	x														x	
Eucalyptus globulus	x	x	x	x												x		x	
Grevillea robusta	x	x	x	x		x											x	x	x
Jacaranda mimosifolia	x			x	x			x										x	x
Jumperus procers	x		x	x												x			x
Leucaena leucocephals	x	x	x	x													x	x	x
Maesa lanceolata	x															x			
Mangifera indiea	x									x			x				x	x	x
Olea atricana	x	x	x	x	x		x	x								x		x	
Phoenix reelinata	x									x									
Pinus Patula	x		x	x															x
Podoearpus falcatus	x		x	x		x										x			x
Prunus alricanus	x	x	x	x				x								x		x	x
Schinus molle	x	x		x								x				x		x	x
Sesbania Sesban	x			x													x		x
Spathodea campanulata	x	x						x								x		x	x
Syzygium guincense	x	x	x	x			x									x	x	x	
Vernonia amygdalina	x	x														x	x		

Keys: A = Arid and semi-arid lands; L = Water body boundaries; H = Highlands

Table 7.7 Summary list of some possible exogenous grasses and legumes for the day zones.

Grasses	Legumes
• *Cenchrus ciliaris* (Buffle)	• *Macroptilium atropurpureum* (Siratro)
• *Chloris gayana* (Rhodes)	• *Lablab purpureus* (Lablab)
• *Sorghum almum* (Columbus)	• *Stylosanthes guinanensis* (Stylo)
• *Panicum maximum* (Green Panic)	• *Stylosanthes hamata* (Verano stylo)
• *Panicum coloratum*	• Desmodium spp.
• *Andropogon gayanus* (Gamba grass)	

1 Description

Note: The information provided for each of the species is extracted from the books Tropical Grasses (FAO, 1990) and Tropical Forage Legumes (FAO, 1988) and available in the FAO Plant Production and Protection series. For further reading, please refer to these books and other reference material on the subject. However, some would certainly be of value and should be tried under different soil conditions. Below is a list of potential grass and legume species for improvement of closed areas, ley pastures, fallow lands and stabilization of physical structures. Based upon the different site conditions (soil texture, reaction, fertility, land use, and others), select the most suitable species or combination of species for your area.

2 Grasses

Cenchrus ciliaris

Common name: Buffle grass
Description: It is a tufied and spreading perennial, 12-120 cm tall and deep-rooting.
Rainfall requirements: 375-750 mm
Drought tolerance: Very good.
Soil requirements and tolerance to salinity: Light textured soils are the best. It is slow in black cracking soils, but when established it does well. It is moderately tolerant to salinity.
Ability to spread naturally: Sreads well by seeds.
Sowing method, seeding rate, sowing depth and cover: Surface sowing or not deeper than 1 cm. preferably, use spacing in rows of 30 cm. Seeding rate is 4 kg/ha. Scarification increases germination. Fresh seeds have poor germination (better wait 3-12 months).
Seed treatment before planting: Treat the seed with lindane dust, 20% dust at 1 kg per 80 kg of seeds if seed-harvesting ants are prevalent.
Minimum germination and quality required for sale: Buffle has poor germination.
Grazing: Buffle withstands considerable grazing once it is established.
Minimum germination required is 20% and 90% of purity.
Compatibility with other grass and legume: Buffle is often sown with Columbus grass (Sorghum almum), Rhodes grass and others but not with legumes (competition high from Buffle).
Ability to compete with weeds is rather good.
Suitability for hay: Reasonably good hay of grasses are collected in the early flowering stage.
Palatability: Very palatable when young and fairly palatable at maturity.
Toxicity to horses observed.
Value and potential: It is one of the best adapted grasses to semi-arid conditions. Resistant to trampling and to dry spells.
Limitations: Does not control erosion very well (plant structure). Does not grow well on heavy soils, should not be used as ley pasture before cropping because difficult to remove for cultivation and its depressing effects on a following crop. Suitable to stabilize structures on forest and grazing lands, improve pastures and waste lands.

Chloris gayana

Common names: Rhodes grass
Description: A glabrous, usually stolonifereous perennial upto 90 cm high, but very variable, roots upto 4.7 m depth.
Rainfall requirements: 600-750 mm.
Drought tolerance: Good.
Soil requirements: Grow on a wide range of soils, prefers loose-textured loams. Tolerates temporary waterlogging
Tolerance to salinity: Excellent
Ability to spread naturally: Excellent (produce stolons which creep over the ground and produce abundant seed.
Sowing method, seeding rate, sowing depth and cover: Drilling seeds in rows, or broadcast, mixed with sawdust, on the surface or no deeper than 2 cm and covered with a bush or a roller. Recommended seeding rate is 4 kg/ha.
Minimum germination and quality required for sale: 50-60% and 50% purity.
Grazing: It stands considerable grazing and defoliation. Better graze before flowering.
Seed treatment before planting: Treat the seed with lindane dust, 20% dust at 1 kg per 80 kg of seed, if seed-harvesting ants are prevalent.
Compatibility with other grass and legume: Does grow wtith stylosanthes.
Ability to compete with weeds: Moderate, good after burning of scrub lands.
Suitability for hay: It makes quite good hay if cut just as it begins to flower or a little earlier. Old stands give low-quality hay.
Palatability: Young growth is very palatable, but after plants have seeded they are less attractive.
Toxicity: None.
Value and potential: It can be used for pasture lay and stabilization of forest areas. not recommended along bunds near to cultivated fields. It is widely adaptable and easy to establish. Good erosion control.
Limitations: Short season of nutritive peak in many cultivars.

Sorghum almum

Common name: Columbus grass
Description: It is a short-term perennial, tall, well above 2 m, producing short rhizomes, reaching a depth of 50 cm.
Rainfall requirements: 460-760 cm
Drought tolerance: Moderate to good.
Soil requirements and tolerance to salinity: Prefers soils with good fertility, from loams to heavy clays. Tolerates temporary waterlogging and is tolerant to salinity and sodicity.
Ability to spread naturally: Slow
Sowing method, seeding rate, sowing depth and cover: Planted in rows or broadcasted at 2 cm depth on a fine seedbed. Roll or light harrow the field after sowing. Seeeding rate 2-4 kg/ha.
Seed treatment before planting: No dormancy. If necessary treat it with fungicidal and insecticidal dust.
Minimum germination and quality required for sale: 70% germination and 90-100% purity.
Grazing compatibility with other grass and legume: Same as Cenchrus ciliaris (Buffle) and Chloris gayana (Rhodes).
Ability to compete with weeds is rather good.
Suitability for hay: It gives quite good though coarse hay, which is useful during the dry season.
Palatability: Quite palatable, but not as readily eaten as annual sorghums.

Toxicity: Commonly to other sorghum species. Columbus grass contains dhurrin, a cyanogenetic glucoside which can be toxic, particularly in plants carrying young shoots either from the base or old stems.
Value and potential: It is quite valuable for erosion control on hillsides but needs N application to form an effective cover. It is also recommended for ley pastures and cropping, improve fallows and stabilize treanches constructed on good soils.
Limitations: Does not like very high temperatures and prolonged periods of drought. It is also a difficult weed to eradicate in irrigated crops. It normally has a short life (2-4 years).

Punicum coloratum (var. makarikariense)

Common names: Makarikari
Description: It is an erect (1.5 m) perennial with robust culms and shortly rhizomatous. seldom stoloniferous.
Rainfall requirement: 500-1000 mm.
Drought tolerance: Moderate.
Soil requirements and tolerance to salinity: Best performance in high fertility black clay soils. Very tolerant to waterlogging and to saline conditions.
Ability to spread naturally: Sow (by seeds) and occasionally stolons.
Sowing method, seeding rate, sowing depth and cover: Prepare a good seed-bed. Drill seeds 1-1.5 cm deep in rows (30-90 cm apart) or broadcast, and roll afterwards.
Seed treatment before planting: Initial dormancy. The seed requires a ripening period of 6 months after harvest.
Minimum germination and quality required for sale: 20% germination and 80% purity. Scarify seeds.
Grazing: Withstands heavy grazing but should be lightly grazed during the first year to encourage tiller development
Compatibility with other grass and legume: Low.
Ability to compete with weeds: Low, require weeding at initial stage.
Suitability for hay: It makes good hay.
Palatibility: It is very palatable.
Taxicity: None.
Value and potential: May be useful in erosion control because of its large crown development. Good for mulching and stabilization of structures in heavy clays and wateerlogged areas (add N fertilizer).
Limitations: Uneven seed set and seed shattering.

Panicum maximum var. *trichloglume*

Common names: Green Panic.
Description: A tufted, tall (over 1 m) perennial with fine stems and leaves with a short creeping rhizome.
Rainfall requirements: 650-1700 mm
Drought tolerance: Moderate.
Soil requirements and tolerance to salinity: It does best on deep fertile loams but performs well in moderatly fertile sandy loams and black soils. Moderate tolerance to salinity (upto pH 8) an slight tolerance to waterlogging (few days only).
Ability to spread naturally: Slow to moderate.
Sowing method, seeding rate, sowing depth and cover: A fine seed-bed is needed. Sowing is in rows (30-90 cm) or broadcasting, drill the seed at maximum 1 cm depth and cover lightly. A 4 kg/ha seeding rate is recommended.
Seed treatment before planting: Dormancy is very long (18 months).
Minimum germination and quality required for sale: 20% germination and 70% purity.

Compatibility with other grass and legume: It is compatible with buffle but not with Rhodes. It grows well with (Macroptilium atroppurpureum) legume.
Ability to compete with weeds: Good.
Suitability for hay: It makes a good hay when cut at flowering stage.
Palatability: Very good.
Toxicity: Rare.
Value and potential: Not very useful to control erosion (plant structure). Good for loamy sandy areas, for stabilization of structures and improved leys.
Limitations: Lack of persistence in poor soils without application of fertilizers.

3 Legumes

Styloshantes hamata

Common names: Verano stylo
Description: Short-lived perennial legume; grows low and develops a flat crown under grazing, erect stems may grow 80 cm high under good condition and can produce a considerable amount of seeds (can yield upto 1 ton/ha).
Rainfall requirements: 600-1200mm
Drought tolerance: Good
Soil requirements and tolerance to salinity: Grows on a wide range of soils but prefers well drained sandy soils of low fertility and do not stand well in cracking clay soils and waterlogging. It is also rather alkaline and saline resistant.
Sowing method, seeding rate, sowing depth and cover: Stylo is easy to establish, over sowing at the surface after rough opening of the soil with implements. Row sowing is also possible with seeds drilled into rows, at 0.5-1 cm depth and covered lightly, 3-6 kg/ha is recommended.
Seed treatment before planting: Not required except for fresh seeds (scarification in hot water-70^{0}C for 10 minutes.
Minimum germination and quality required for sale: 20-40% germination and 96% purity.
Grazing: Tolerates heavy grazing and produces much seed on branches close to ground in these circumstances.
Compatibility with other species: Can be a good companion crop with Buffle
Ability to compete with weeds: Good in poor soils and pastures but in cultivated fields weeds compete vigorously with stylo. In this case, deep ploughing and harrowing before sowing stylo is necessary, particularly if stylo is to be used for ley cropping or improved ffallows (see measures).
Suitability for hay: Makes good hay
Palatibility: Good
Toxicity: None
Value and potential: Easy to establish, restore fertility of poor soils and is one of the most popular conservation legumes.
Limitations: Does not tolerate shade

Macroptilium atropurpureum

Common names: Siratro
Description: Perennial legume with strong creeping stolons and broad leaves; short-lived if heavily grazed.
Rainfall requirements: 750-1500
Drought tolerance: Good
Soil requirements and tolerance to salinity: Versatile legume; grows well in shallow soils (hillside legume) but is not tolerant to low fertility as is stylo; not very tolerant to waterlogging.

Sowing method, seeding rate, sowing depth and cover: Can be either drilled at 1-2 cm depth (seed rate 4 kg/ha) or broadcast (seed rate 6 kg/ha) in well prepared seed bed. Phosphates applications at sowing time ensures an excellent establishment.
Seed treatment before planting: Seeds are hard and need scarification in hot water at 80° C for 10-15 minutes.
Minimum germination and quality required for sale: 70% min. germination and 97% purity.
Grazing: Moderate
Compatibility with other grass and legume: It combines well with Rhodes, Green panic and Buffle.
Ability to compete with weeds: Moderate to good
Suitability for hay: Limited by the creeping structure of the plant
Palatability: Good
Toxicity: None
Value and potential: Most important legume for its excellent nodulation and ability to restore fertility in shallow soils, and stand various associations with different grasses for mixed pastures.
Limitations: Not suited to waterlogging and sodic areas.

Dolichos lablab

Common name: Lablab
Description: Short lived perennial or annual legume. It forms a vigorous, erect seedling which later develops long trailing stems. It has very large leaves.
Rainfall requirement: 500-1500
Drought tolerance: Good
Soil requirements and tolerance to salinity Is suited to a wide range of soils.
Sowing method, seeding rate, sowing depth and cover: Seeds are sown drilled at 1-2cm depth after rough seedbed preparation, with seed rate 6 kg/ha in mixture with grass and 15-20 kg/ha as sole legume.
Seed treatment before planting: None or light scarification. Inoculation is recommended.
Minimum germination and quality required for sale: 75% germination and 97% purity.
Grazing: Good
Compatibility with other grass and legume: Good as cover crop and for improved fallows, ley cropping, green manuring with fodder crops (sorghum, millet) and few grass.
Ability to compete with weeds: Good as grazed fodder crop.
Suitability for hay: Poor.
Palatability: Good but cattle may take some time to get used to the taste of lablab.
Toxicity: Some bloat occasionally occurs when hungry animals graze lush vegetation. Otherwise none.
Value and potential: As good as, and even better than, cowpea (Vigna sinensis) for green manuring and as a pioneer pasture legume.
Limitations: It is an annual under dry zone conditions.

Annex 8
Community-based Solidarity Efforts

1 Community-based Solidarity Schemes in Watershed Development

The following example attempts to describe the potential that exists in using community and groups joint support to assist most needy households, thus strengthen solidarity amongst community members. These mechanisms are built upon existing traditional work parties and forms of assistance to those most in need. Step 9 of the PWD guideline (*Community-based Participatory Watershed Development: A Guideline*) describes such opportunities.

Existing program and project self-help efforts are opportunities to start supporting such schemes. The aim is to strengthen local capacity to manage emerging or existing food insecurity and poverty problems. These schemes are also considered a key element in natural resource management and improvement in all areas.

1.1 Scenario-building in community-based watershed development activities and labor requirements

Each community-based watershed plan will include measures and various resources requirements, particularly labor. Only labor is considered in this exercise.

Illustration 1: Profile of community and watershed planned activities

a) Profile of a community (common situation):. Community with 1200 people – approx. 200 HHs (100 of which are chronically food insecure). Total area 500 ha: communal area 200 ha; cultivated land 200 ha (100 HHs have less than 0.5 ha); grazing land 50 ha; gully area 25 ha, village and homesteads 15 ha; and area under other land uses 10 ha.

b) Possible assets needed at the Household (HH) level (labor requirements only):

(1) Hand-dug shallow well and/or micro-ponds[1] : approx 100–200 PDs (excavation, seepage control, conduits, stone paving, and others.)
(2) Compost pit: double pit (20 cubic meters) – 20PDs
(3) Vegetative fence: approx. 500 meters/homestead – 20 PDs
(4) Trenches/eyebrows for high valued trees: at least 10-20 structures/HHs – approx. 10 PDs
(5) Erosion control in cultivated land (assumed to be 0.5 ha/HH): 0.5 km of soil or stone bunds +/- vegetative stabilization: approx 100 PDs
(6) Gully control adjacent cultivated or within cultivated plots: assumption of at least 5-8 small checks/HHs: 20 PDs

[1] Micro-ponds are not always the best choice and their selection is influenced by the availability of catchment areas, the correct type of soil and other factors. In some areas the number of water ponds can be high while in others low. If the watershed is treated properly, hand-dug wells may be the first choice measure. Additional key considerations are essential for hand-dug wells. The latter should be dug with extreme care and as per the water-table recharge and the quality of water, all this linked to watershed treatment and management. For hand-dug wells, specific recommendations about spacing between wells based upon recharge need must be strictly followed to avoid severe and irreversible damage to the structure and to the fields

(7) Diversion drain: small protection and diversion for water storage: 10 PDs

Total need per HH: 280-380 PDs
Total need for 100 vulnerable HHs = 280/380 x 10x 100 = 28,000/38,000 PDs or (these assets are also relevant for most of the remaining 100 HHs in the community – i.e. they can reach 56,000/76,000 PDs)

(c) Labor requirements for communal asset[2] and for treatment of sub-watersheds with large degraded areas:

(1) Moisture conservation systems (hillside terraces and/or trenches and eyebrow basins) and closure for upper watershed protection (runoff, erosion, and others.), water-table replenishment and biomass production: approx 50,000–70,000 PDs depending on measures (for 200 ha)
(2) Large gully networks with SS dams, checks, biological stabilization, control grazing, fencing): approx 5-10 kms of gullies in each community: approx. 20,000 PDs
(3) Feeder roads built/maintained: assume 3 km of feeder road built/community: 10,000–12,000 PDs
(4) Community water ponds dug and maintained: approx 2 ponds x 8000PDs (average) = 16,000 PDs
(5) Spring development and night storage + nursery establishment: 1000 PDs
(6) Tree planting, cut and carry, and others.: requires at least 1000 PDs/year

Total: 98,000-120,000 PDs for community assets

Grand total community + HH assets: range from 154,000 to 196,000 PDs for the community members to complete the range of basic assets.

The above show that in this specific community, HHs need to invest approximately 770-980 PDs each to attain the level of assets described above (combined HHs and community assets). Within the time span of three years it implies at least 256-326 PDs/HH/year or in five years 154-196 PDs/HH/Year need to be invested in such multiple assets building. If we assume that only 100 HHs out of 200 are getting substantial support for labor-based activities, this implies that the time required to achieve such investment will be probably longer, or that other programs need to complement the existing support (CFW/FFW/Safety Nets, and others) and self-help contributions to create such watershed development assets.

Although the numbers may be on the lower side of this estimate, they are nonetheless high and inform the need to use all resources effectively. Households building assets will be most effective if they are all established simultaneously or in rapid sequence (within three years for the major ones) to respect and take the maximum advantage of watershed logic. Furthermore, most HH-based efforts will be meaningless unless simultaneous and effective treatment of degraded areas and communal areas is undertaken. The same applies to community infrastructure.

The above visualizes the community as understanding what is required at different levels of the watershed for various people and then come up with a strategy to use available and additional support to develop its potential and effectively help those most in need.

[2] This exercise visualizes possible scenarios related to labor only. It should not be used to generalize for all situations as the type of assets to be built may require much lower or much higher labor inputs in different areas.

1.2 Estimate support to a given community and prepare labor-based participatory watershed development "contracts"

The examples below assume a common situation in food insecure and degraded areas as these areas are commonly receiving various forms of assistance. However, a similar approach is also valid in non-food insecure area using self-help mechanisms or government support.

In addition to the self-help contributions, food-insecure communities may be supported with an amount of cash or food resources calculated based upon needs. This amount can then be converted or translated into a **labor-based "contract"** with the community. The resources provided or to be provided can be translated into person days. The total cumulative person days can then be taken up as a credit that the able-bodied target group should "repay" back to themselves or to the community in a participatory manner, or to specific groups e.g. selected female-headed households and households headed by elders) they themselves prioritize during a given year in terms of assets building.

Supporting specific disadvantaged groups is extremely important since such households are usually heavily dependant on natural resources for their survival. The need to improve their asset is based on everybody's support. The same approach can be followed by adding all possible self-help contributions and other assistance available in non-food insecure areas. The total amount of local resources could then be used to support specific groups within the context of watershed logic on various levels.

Illustration 2: Description of common situations in a hypothetical food-insecure community provided with a participatory watershed development plan

The assumption is (1) a community of 200 households (2) 50% of whom are targeted for cash/food assistance; these HHs have small to very small plots of land with various other constraints such as lack of oxen, limited labor, lack of other assets such as tools and credit. In other words, around 100 HHs in such a community have either depleted, eroded, or insufficient assets; (3) each of the 100 HHs is characterized as being exposed, on the average, to five months of food gap annually; 20% of the HHs are women-headed; (4) about 20 of the 100 households are not able-bodied or they are labor-poor and are therefore assisted through social networks or direct transfers; (5) on the average, each family has five members. Based on the above, the needs of the most vulnerable group of HHs are calculated as follows:

- 75 kgs/month/family (30 Birr/15 kgs/person/month x 5 average family size) of food x 5 months = 450 kgs of food aid for each family for a given year or an equivalent of cash support of 900 Birr/year/family based upon equivalent prices.
- When converted to labor days, 900 Birr/450 kgs are equivalent to 150 labor days. Assuming 80 able–bodied HHs it translates into 12,000 person days (PDs) or labor days for the whole group of HHs and beneficiaries.
- Assuming 150 out of 200 HHs will also dedicate their self-help contribution to the labor required, and considering an average of 50 days/year/HHs (1-3 members support/HH) this implies additional 7500-10,000 PDs available/year.

→ **A total of 19,500–22,000 PDs/year can be seen as a basis for a comprehensive "labor-based contract" for the community watershed development.**

NOTE: The target group can then assess different options and priorities since the total number of labor days is still insufficient to cover the projected figure mentioned above, even considering a period of five years (approx. 65–50%, respectively of 156,000–196,000 MTs of the total PDs needed). Therefore, in addition to this number of labor days, the contract can be supplemented by labor days provided by the whole community after a couple of years as additional self-help contributions and possibly by using other forms of support. Furthermore, adjacent communities can "merge" their contracts for specific activities of common interest, particularly for large watershed treatment, which are basic for other activities to come.

1.3 Explore the options on how best to use the labor-based watershed development "contract" with the community

This process can all be part of a simple but effective participatory planning exercise when the community/group sets for itself, the precise objective of making the best use of the "contract". One option is to use the number of labor days available all for community works. The second option is to split the number of labor days available into a combination of different sets of activities. For example, a given number of labor days can be dedicated to achieve community / public works and the reaming number of days to build assets for needy individuals.

Simple, but highly powerful mechanisms such as the wonfel and similar working parties arrangements can be adapted to fulfill such contract and the preferred modality on how the target group will build such assets. There are numerous possibilities that need to be seen within each context and determined based on local situations.

Activities that can be implemented result from the interaction between DAs and community members following the participatory watershed planning approach. In this particular case focus during planning should be on which activity needs full support by paid labor, which one include self-help support and the amount of it, and finally which one should be undertaken only by using self-help contribution.

The proportion of such combinations will vary from area to area and for different households, depending on the level of vulnerability of the target group.

Illustration 3: A hypothetical case of creating community-based watershed assets and benefit most vulnerable households

Following the example in Illustration 2 above, the community identifies some 10 resource poor female-headed households (amongst the able bodied 80) and some 20 labor deficit households managed by elderly/partially-disabled individuals (including 10 women HH). In consultation with these individual households and building consensus at the larger community level, the community watershed team (CWT) could divide the available labor time into some key community works as priority for watershed treatment and a range of strategic activities that would lay a solid asset bases for the identified most vulnerable 100 households. Evidently, each of the 100 most vulnerable households will have varying resource endowments and so should not be expected to manage similar sets of assets. Consider the following illustration.

(a) Community assets: use 10,000 PDs for such assets – priority given to upper parts of watersheds

(i) De-silt and deepen (6 meters) a large community water pond + build silt trap and fence 2000 PDs
(ii) **3000 PDs** for 10 kms of trench-based hillside terraces in 20 hectares of area closure (assist in replenishment of water-tables, increased fodder biomass, tree planting)
(iii) Multi-purpose trenches/eyebrow basins for enrichment of better portions of closures (20 ha) and planting of different tree/fodder species as well as cash crops: **2500 PDs**
(iv) Cutoff drains and waterways to protect approx 40 ha of cultivated land: five mayor conduits and five paved waterways: approx. **5000 PDs**
(v) Soil storage and overflow dams (SS dams) across large gully (6 structures): **2000 PDs**

(b) Sub-watershed treatments and HHs based assets (*): dedicate **9,500-12,000 PDs** for the following priority list of assets. It is assumed that 30% of the total PDs is dedicated to support those most needy households

(i) Construction of 20 hand-dug wells in specific locations (well designed to avoid affecting discharge), including 10 for most needy HHs: **1000 PDs**
(ii) Construction of 15 micro-ponds: **3000PDs**
(iii) Establish 10 kms of tight vegetative fences (40 PDs/km) using local materials (*Euphorbia, Erythrina,* sisal, and others.) established around farms and closures: **400 PDs**
(iv) 100 compost pits for 100 HHs (each of 5-6 m^3 (10PDs/pit) x 100 HHs: **1000 PDs**
(v) 500 Eyebrow basins (10 per HH) for fruit tree planting = approx **350 PDs**
(vi) 30 hectares of cultivated land treated with soil bunds for 50 HHs = approx. **2000 PDs**
(vii) 2 Km of gullies treated using check dams on gullies along cultivated fields = **450 PDs**
(ix) 150 kgs of seeds from indigenous species and valuable grasses collected = 300 PDs
(x) One nursery established and used for income generation groups = 250 PDs
(xi) Revegetation of gullies and manuring of planting pits in closures = 500 PDs
(xii) Spring development and others (cover/shade of wells and micro-ponds, and others) = 250-1750 PD

Total 19,500-22,000 PDs for year 1 activities by the 200 HHs combining self-help and additional resources.

(*) This does not include agronomic and fertility management practices (part of standard farm operations)

Potential outputs in one year as a result of the above measures:

- Deep community water ponds that have water for an additional 3-4 months
- 25 ha of productive closures shared amongst 100 HHs (0,25 ha each) and additional 15 ha used communally. Closure reinforced with moisture conservation structures for enhancing water intake and allow new agroforestry practices within closure.
- 90 compost pits for 90 HHs for a total production of 0.8-1.2 tons of compost/HHs – compost sufficient to increase productivity by 30-50% within two years' applications
- Additional 10 compost pits prepared by 10 landless HHs as a compost "entrepreneurship" activity (i.e. local "fertilizer factories") for income generation.
- At least 50 HHs out of 100 provided with a thick vegetative fence around homesteads and/or groups of neighbors' cultivated fields. The 10 kms of vegetative fence will help creating a large-scale "web" that protect fields from wind and water erosion, and help preserve moisture and allow additional boundaries to become increasingly productive.
- Inside homestead areas specific over 500 major moisture conservation structures for planting fruit trees and/or cash crops established and conservation measures constructed in cultivated fields of 50 HHs for moisture conservation and integrated with watershed management.
- 20 HHs, including 10 most needy HHs (mostly female headed HHs with limited extra labor capacity) provided with hand-dug wells and additional 15 with micro-ponds.
- 100 HHs access clean and safe water
- Drainage control and runoff protection

The above outputs may be greater for specific activities of mutual interest in upper portions of watersheds or along large gully networks where two or more communities could join their efforts and "contracts" – in which case the area covered may be larger.

Cumulative social and natural resources development gains expected in year 1:

Cumulative assisted and self-help results can be as high as the following, provided the correct type of watershed-based planning and technical approach are applied by local communities and technical departments:

- 50% of households improve or retain existing productivity and gain new assets (compost applications, improved closure, SS dams for individual HHs, and others.)
- 10-20% of most needy households gain multiple productive assets (wells, fruit trees, and the like.) and additional 10% gets involved in income generation activities
- Erosion significantly reduced approximately 20% of the total land
- Water-table raised and biomass doubled
- Increased water in large ponds allows a women group (10-15 women) to introduce small horticulture activity nearby pond (0.15 ha area conditioned and fenced)
- Solidarity mechanisms of social protection for the most vulnerable strengthened and supported by all
- Self-esteem building and understanding of the value of resources provided (not a given)
- Visualization of possibilities and opportunities for productivity improvement amongst community members,
- Set of protection oriented by-laws (social, physical and natural resources protection) and regulations reflected in community and wereda assets management plans.
- New water harvesting structures established and provided with improved safety (protection from malaria, and others) and integrated with the other measures above.

Annex 9
Planning Formats - Samples

MINISTRY/BUREAU OF AGRICULTURE AND RURAL DEVELOPMENT

COMMUNITY BASED PARTICIPATORY WATERSHED DEVELOPMENT PLAN QUESTIONNAIRES

(VILLAGE/COMMUNITY):_____
KEBELE: _____
WEREDA: _____
ZONE: _____
REGION: _____
DATE: _____/____/_____EC/____/____/_____GC

1) BACKGROUND INFORMATION ON THE AREA AND COMMUNITY

- Name/Title of DAs/experts: _____ Title: _____
  _____ Title: _____
  _____ Title: _____

Date: _____

- Region: _____ Zone: _____
- Wereda: _____
- No of sub-watersheds of main relevance for the community: _____
- Main sub-watershed name/location within which the community is located: _____
  _____
- Kebele/tabia: _____
- Village/community: _____
- Total No of headed households living in the community: _____ /Male/_____/ Female: _____
- Total No households cultivating in the community: _____ /Male/____ / Female: _____
- Population living in the community/target group: Total: _____ /Male:/ _____ Female: _____
- Family size (average): _____
- Average total landholding size (ha)/family head: _____
- Average cultivated land size (ha)/family head: _____

Community Watershed Development Team

TEAM MEMBER NAME	GENDER	TITLE	SOCIAL STATUS/RANK	SIGNATURE
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
.				

Total male:_____ %_____
Total female:_____ %_____
Remark: _____
_____
_____
_____

2) PROBLEM IDENTIFICATION (PI)

Problems	Main causes (*)	Severe	Medium	Low	Rank

POSSIBLE SOLUTIONS (add extra pages if necessary):

1.

2.

3.

4.

5.

6.

3) WEALTH RANKING AND ANALYSIS OF COMMUNITY CONSTRAINTS

A) DISTRIBUTION OF HOUSEHOLDS BY SIZE AND LAND OWNED

Land size (local unit: timad, etc.)	Land size (Hectares)	Total No. of Households	%	Male	%	Female	%
0	0						
1 – 2	0,25 – 0,5						
2 – 4	0,5 – 1						
4 – 6	1 – 1,5						
> 6	> 1,5						
Total			100				

B) WEALTH RANKING AND VULNERABILITY ASSESSMENT

Describe the main criteria the community uses to categorize wealth in the community (2-4 categorieB) Gs) and the main reasons for such classification.

Criteria: **Wealth Rank 1:**

Vulnerability factors (main):

Wealth Rank 2:

Vulnerability factors (main):

Wealth rank 3:

Vulnerability factors (main):

Wealth rank 4:

Estimate the proportions of households in each category (use existing data, for example household surveys and general discussion with the planning team and Kebele leaders without pointing at specific individuals by category)

W. Ranks	Male HH	% of Male	Female HH	% of Female	Total HH	% of Total
1						
2						
3						
4						
Totals		100		100		100

C) COMMUNITY CONSTRAINT ANALYSIS: DIAGNOSIS

PART I CROP PRODUCTION (FARMING SYSTEM ON CULTIVATED LAND)

(i) General information (add extra lines and modify the table if necessary)

Main Subsistence crops		Main Cash crops	
Annual	Perennial	Annual	Perennial

Agriculture calendar (fill in months of the year)

MAJOR CROPS	PLOUGHING 1rst,2nd,3rd,4th	SOWING	WEEDING	HARVESTING & TRESHING

Farmland distribution (complete after the physical description of the area)

Cultivated land allocation	Hectares (ha)	%
Cultivated land used for Meher crop production only		
Cultivated land used for Belg crop production only		
Cultivated land used for both Belg and Meher crop production		
Homestead farms with perennial crops		
Land with perennial crops only		
Homestead farm only		
TOTAL		100

ii) Existing Rotation (including fallow)

Crop 1: _____ Year _____ from month _____ to month: _____
Crop 2: _____ Year _____ from month _____ to month: _____
Crop 3: _____ Year _____ from month _____ to month: _____
Crop 4: _____ Year _____ from month _____ to month: _____
Crop 5: _____ Year _____ from month _____ to month: _____
Crop 6: _____ Year _____ from month _____ to month: _____

Draw the pattern

Description of the trend observed in the last ten years regarding the rotation (shortening of fallows, monoculture, increase of nutrient mining crops and decrease of fertility restoring crops, etc.) – discuss linkages with erosion, overgrazing, coping mechanisms and food insecurity (watershed and sub-watershed links).

_____
_____
_____

iii) Crop yields

Yield per ha (Qls.)				
Crop	Average Yield	Good Year	Bad Year	Remarks

Describe yield variations and for which crops

_____
_____
_____

Farmers' impression about increase or decrease of yields? For Yes or No increase, explain reasons for low yields (beyond the drought explanation).

_____
_____
_____
_____
_____

iv) Land preparation, sowing & planting

How many times farmers plough (mention for main crops)?

Do you plant in time before the rains? If not, explain main reasons and how many (% or No) farmers usually do not plough on time.

How do farmers normally sow and plant crops (rows, broadcast, etc.)? Describe effect on yields if any and/or adoption of improved practices

Crop	Variety	Seed (improved/local)	Seedling rate/ha	Time of planting

Does your planting technique evacuate excess water or improve drainage (high rainfall areas, waterlogged prone areas). If yes, how? Does it cause erosion?

Are seeds washed away during rain showers? For what crop and in which type of soils/ slopes?

What are the main farmers suggestions to improve the planting techniques and land preparation?

v) Fertilizer use

Are fertilizers used? Yes/No? If yes to which extent (fill below)? _____

Total cultivated land (ha)	With fertilizers (ha and %)		Without fertilizer (ha and %)	

Crop	Type of fert.	Application rate (for main 2-3 crops)

Is the application optimal? If not, what would you recommend?

Which traditional or improved fertility improvement practices are being used (compost, farm-yard manure, mulching, agro-forestry, etc.)? Which of these practices is on the increase and meeting farmers' interest? Describe.

Are they sufficient to your crop production requirements? Yes/ No, If not, what is the reason? How could you maximize/improve their utilization?

Do you have sufficient local materials/livestock to produce organic materials? If not, how could the problem be addressed? Are there areas that can be improved that would supply such materials? Which ones and how? Describe

vi) Pest Control and Weeding

How are pests controlled. What methods do you use?

How is weeding carried out? Do you have sufficient labour for weeding? Do women participate? For how long? Is weed control a critical problem? Describe farmers suggestions to tackle the problem

vii) Drought (applicable in drought prone areas)

Describe drought recurrence in the community/Kebele (every_____years)

How many people on average suffer from drought in your community (number and %) when it occurs:

_____ _____ %

Who are the most affected people (by gender and status) and explain the reasons?

Mention the date and the season of the last three drought events (circle the season affected by drought)

_____ (Belg/Meher)
_____ (Belg/Meher)
_____ (Belg/Meher)

Do you think there is an increase of drought & crop failure occurrence? If yes what are the causes of such increased recurrence (discuss also other causes than low rainfall)?

_____
_____
_____

Are belg rains relevant to crop production? Yes/No. If yes, to what extent and for which crop?

_____
_____
_____

During drought what coping strategies do you use? What is the role of women in this regard?

_____
_____
_____

(viii) Crop marketing (add extra lines as required)

What are the main crops for sale?

_____
_____

Are there specific perennial cash crops you grow and sell? Yes/No
If yes, which ones are these?

_____
_____
_____

For which crops prices are satisfactory and which ones low?

_____
_____
_____

Do you feel that transportation costs are reasonable? Is produce marketed individually or by group?

_____
_____
_____

Do you think that the markets in your proximity can absorb additional produce? How is the accessibility? Are markets accessible throughout the year? Describe (ask questions to women in particular)

_____
_____

Do you think that if your crop production increases you would have no difficulty finding new markets? What kind of outlet do you have and/or foresee? (Explain by gender)

Are you satisfied with the marketing infrastructure in your village or nearest market town (assembly points, market facilities, etc.) Explain by gender.

How can your marketing situation be improved? (ask women in particular – may link to feeder roads and inter-community works that need watershed treatments)

(ix) Labour supply

Is labour a constraint? Yes/No. If yes, for which type of crops and agricultural practices? What is the role of women and their time spent in the various tasks?

What months of the year is labour a constraint? Why?

Which month (s) is the slack period?
Female:

Male:

Labour profile

insert main tasks and weight them using No of days/filling the spaces, etc.

- **Tasks Male**

J F M A M J J A S O N D

- **Tasks Female**

J F M A M J J A S O N D

Do farmers hire people during peak period of activities? For which type of activities? Within the community? Outside? For how long? How much do they pay per day? Is it the same for male and female workers? Explain

How much does labour cost/ha/year to an average family (main crops)?

x) Input provision and utilization (mainly fertilizers, improved seeds, hand tools, etc.)
Describe provision of inputs and whether it is a constraint? If yes, what is the constraint and for which input?

Are extension packages integrated with conservation practices (terracing, drainage, catchment protection, control grazing, etc.)? If yes, which ones (explain in detail)? If not what are the reasons and farmers' suggestions?

(xi) Harvesting, Handling and Storage of food grains/other products (answers by women in particular)

Is crop harvesting a problem in your area? If yes, explain the reasons

Are post-harvest losses high? If yes, explain. How much (in % and Qls. for the main crops) is approximately estimated as loss? What precautions are taken?

Do you have sufficient storage capacity? Are stores in good conditions? Are pests/insects affecting food stored? How do you prevent infestation (traditional or new methods)? Describe.

(xii) Extension and Training (add extra lines if necessary)

Have you been instructed in the use of agricultural inputs, agronomic practices and biological conservation/fertility management measures? Explain

Are farmers satisfied with the training you have received? Provide suggestions

In what subject areas do you require training?

_____

_____

xiii) Land tenure

Describe the crop land tenure arrangements? Are rights to the land shared? Is lease or rent common? Describe the system. Explain the differences (if any) between male and female.

_____

_____

_____

Are land use certificates distributed? If yes, is there any improvement in the landholdings management since the land is certified?

_____

_____

_____

Do farmers use cultivated land for grazing after harvest? If yes, what time of the year? Are cultivated fields grazed individually or by groups/the whole community? Describe

_____

_____

_____

Are fallow lands used for grazing? How long is the fallow period? Can the right holder exclude others from using the land?

_____

_____

Describe tree tenure arrangements? Are trees grown on cultivated land? What type of species and what is their use? Who has the right to these trees? Are tree rights shared between farmers? If so how? Can the right holder exclude others from using the trees? How can this be prevented?

_____

_____

_____

_____

Do you fence your cultivated plots? If yes, where (open fields, mostly near homesteads, etc)? If no, explain.

_____

_____

_____

Are there sufficient local planting materials that can be used for fencing? If yes, what are the potentials for fencing and the benefits you foresee? Describe in detail.

_____

_____

_____

Analysis Sheet for the crop production

Major constraints on livestock production:

Ranking

1.
2.
3.

Main recommendations regarding livestock production:

_____

_____

_____

_____

PART 2 LIVESTOCK PRODUCTION (ANIMAL HUSBANDRY)

RT No. of livestock in the community/group area (ask indirect questions):

Type of animals	Total Number	Average per households cat. (in No and %)
Oxen	_____	—/— —/— —/— —/—
Cattle	_____	—/— —/— —/— —/—
Goats	_____	—/— —/— —/— —/—
Sheep	_____	—/— —/— —/— —/—
Donkeys	_____	—/— —/— —/— —/—
____	_____	—/— —/— —/— —/—

(For instance 10% of farmers have 2 oxen, 50% only 1 and 40% none would be put as follows: ....2./..10%... ...1./..50%... .0./..40%..)
Are the animals local or improved?

_____

_____

What are the common livestock management practices (free grazing, stall feeding, rotation of animals, etc.)?

_____

_____

_____

Summarize animal rearing (in %)

Stationary - free grazing _____
Stationary - zero grazing _____
Stationary - combination of the above two _____
Transhumance _____

What is the productivity of animals? (cattle: calving and calving interval; sheep: sheeping, etc; milk, cheese, eggs production, etc.). Explain.

Are animals in good condition/shape (health, weight)? Why (for a yes or no answer)? How do community members think the situation can improve? Link with watershed treatment of degraded areas, grazing land improvement, homestead development and stabilization.

What are the main diseases affecting your animals? How is the veterinarian assistance in your area? Is there a clinic? Explain how you solve problems related to animal health.

i) Fodder Supply (add extra lines if necessary)

In the table below mark with cross(es) what people use to feed their animals:
very common (xxx), common (xx), rare (x), nil (o)

Sources of fodder	Dry Season	Wet Season	Ranking
Grass on grazing land			
Grass from cut and carry Hay			
Crop residues			
Other (specify)			

Show a diagram on seasonal availability of animal feed

Do farmers have sufficient fodder for livestock? Is fodder supply a seasonal problem? If yes, when? How large is the grazing land? Describe

What type of grasses are found in the communal pastures/roadsides/boundaries/bunds?

What type of grazing management is used in communal pastures? Are these areas degraded? Describe

List some of the most common plants in the village that could provide forage:

crops	grasses	shrubs	vegetables	trees

Do you integrate tree species into the farming system for livestock feed? If so, how are they managed? Is there scope for expansion? Explain.

How do you store and preserve your fodder (cut&carry and hay preparation)? For how long?

How do you resolve the fodder problem? Is there any land for grazing improvement? If yes explain in detail. Describe opportunities for rehabilitating degraded areas.

ii) Product Marketing (add extra lines if necessary)

Are any livestock products sold in the village or send the market? Is it sold directly to the consumers or to middlemen (broker)?

Describe livestock markets in your proximity and the possibility to absorb additional produce?

How much contribution cattle give to the income of farmers in your area/site (average)?
Less than 25% _____
25 - 50% _____
50 - 75% _____
more than 75% _____

The main output of the cattle in your site (meat, traction, milk, manure, skins, others)

How much contribution goats and sheep give to the income of farmers (in %)?

For which animal prices are satisfactory? When?

How can the marketing situation be improved? Provide community members suggestions.

_____

_____

iii) Labour Provision

Is labour a serious problem regarding livestock and fodder production? What months of the year is labour a constraint? Who takes care of the herds? What is the role of women and children in this activity?

_____

_____

_____

_____

iv) Input Provision (veterinary service, water development, supply of improved forage seeds, etc.)

Are inputs a constraint for livestock and forage production? Describe.

_____

_____

Is there an introduction of improved forage seeds/plants? Are these adopted/expanded? Explain reasons for yes/no adoption

_____

_____

Do you have a grass seed multiplication center near your site? Is the provision of planting material sufficient? Suggest improvements (grass multiplication area in tree seedling nurseries, backyard production areas etc.)

_____

_____

_____

v) Land Tenure on Grazing Land (add extra lines)

Are communal grazing arrangements affecting the land (erosion, overgrazing etc.)?

_____

_____

_____

If any, under which grazing arrangement the land is properly managed? Why? Explain.

_____

_____

Describe the different grazing arrangements. Who uses the land (individual/ group/ communal)? Does the entire community have the right to grazing land? Is its use limited? (time/ space/gender)? Describe and link to upper watersheds and gully areas as appropriate.

_____

_____

_____

Is area closure practiced? What are the main benefits? Explain using farmers' measurements of benefits (donkey loads, bundles, etc)?

_____

Do all community members have the right to use fodder from the closure? Only specific groups? How is the closure managed/shared? Are there additional opportunities for closure? Describe suggestions for improvement of closure if any.

Do grazing lands provide a satisfactory forage yield? Can the current yield be improved? How?

Are people outside the community allowed to use grazing land? If yes explain the arrangements. Describe links with adjacent watersheds and communities.

Do you have individual plots for grazing land? Is grazing land certified for some individuals? What are the grazing land improvements being undertaken after certification? Describe.

Are trees planted on grazing land? Who owns/has the right to use the trees?

(vi) Fencing

Are grassland areas fenced? Is it possible to fence grassland without any problem?

What materials can be used?

vii) Extension and Training

Have farmers been provided with advice in livestock husbandry, grazing land management and improved forage development practices? What are the measures being introduced and adopted? Are these measures expanding? If yes/no describe.

In what subject areas do households require training/technical assistance?

Analysis Sheet for Livestock production

Major constraints on livestock production:

Ranking

1.
2.
3.

Main recommendations regarding livestock production:

_____

_____

_____

_____

PART 3 FUEL/CONSTRUCTION WOOD/PRODUCTION AND TREE PRODUCTS

What sources of fuel are used? Mark the table below with crosses: very common (xxx), common (xx), rare (x) and nil (o)

_____

_____

Source of fuel	Dry season	Rainy season
Firewood	_____	_____
Charcoal	_____	_____
Cow dung	_____	_____
Crop residues	_____	_____
Others (specify)	_____	_____

Who is responsible for collecting/using wood (women, men, children)? Explain in detail.

_____

_____

Is it a time-consuming task? For how long do you walk to fetch fuelwood (average in hours and Km/day):

_____

_____

Farmers' Individual Plantation Assessment

Total No of households	No. of households with plantations	Male (%)	Female (%)	Average size of plantation (ha)	Total plantation size (ha) (rough estimation)	Dominant species

Is there a shortage of fuel wood? If yes, when?

_____

_____

Is there a shortage of construction wood? If yes, why-

_____

_____

What are other multipurpose species you value the most and plant in your community? For what purpose (fodder, dyes, gums, medicinal, etc)

_____

_____

Are there additional species you would like to introduce and that have disappeared from the areas? How? Describe farmers suggestions.

_____

_____

Source of Seedlings

Source of seedlings	No of nurseries	No of seedlings produced supplied	Main limiting factor
1. Individual			
2. Government			
3. NGO's Others			

Are seedlings sufficient to cover the demand? Yes/No, If not, what are the solutions community members propose?

_____

_____

Are some seedlings provided for free? By which organization (Gvt, NGO)? Is it interfering with private initiatives? Who are the people running private nurseries (men or women or both)? For how much money seedlings are being sold if any?

_____

_____

How much mature trees cost (mention species, stage, use and price per unit)?

1. _____
2. _____
3. _____
4. _____
5. _____

Natural and Artificial Forest Assessment

Is there a natural or artificial forest in or nearby your area? If yes, indicate size (ha), dominant species and describe ownership (Gvt., farmers group users, community (ies), combination, etc.), year of plantation and/or enrichment, etc.

_____

_____

_____

Is the management of these areas satisfactory? Who are the main users of the areas (men, women)? What are the problems? Describe and link with use of upper reaches covered with forests or plantations.

Is beekeeping practiced in the area? Describe the role of plantations and farmers perception about this activity? Can it expand? Is there a market? Explain potentials and limitations

Is erosion from plantations a problem? Describe suggestions to prevent erosion in plantation sites and linkages with other communities sharing common watersheds with plantations.

What are the main problems regarding fuel/construction wood?

How do you currently resolve the problem and how do you think it can be resolved in the future (woodlots, individual plantations, etc.)?

If utilized, how much is the cost of fueldung (specify the unit)? In which proportion cow dung is used for fuel (%)? Who makes the fueldung (men, women)? Is the rest of it used to fertilize fields? If not, was it done years ago? Describe.

Analysis sheet for fuel/construction wood production

Major constraints in fuel/construction wood supply:

Ranking

1.
2.
3.

Main recommendations regarding fuel/construction wood/tree products supply:

PART 4 WATER SUPPLY for DOMESTIC USE AND LIVESTOCK

What sources of water are used? Mark the table below with crosses: very common (xxx), common (xx), rare (x) and nil (o)

Sources of Water	Rainy season	Dry season
River		
Spring		
Pond		
Well		
Lake		
Dam		

Are you satisfied with the quantity/quality of water available? Discuss sanitation issues and effect on people. Describe main problem (water borne diseases, contamination, salinity, etc)?

Are women responsible to collect water? _____

What is the average distance a person walks to get drinking water in a day? How much time is spent on this task?

Is there a shortage for domestic uses? When and for how long?

Is there a shortage for livestock? When and for how long?

What are the main causes of water shortage in community's opinion? When did the situation deteriorate? Relate to misuse of upper watershed areas and degradation if any.

Currently how do you solve these problems? Describe

How do you think they can be resolved in the future (women answer in particular)? Is there any interaction with other communities that you see crucial to resolve the water problem? Describe.

Analysis sheet for water supply
Major constraints in water supply:
Ranking
1.
2.
3.
Main recommendations regarding water development:
_____
_____
_____
_____

PART 5 WATER HARVESTING AND SMALL-SCALE IRRIGATION

(i) General information

Is there any irrigation agriculture being implemented in the area? Yes/No? If yes, respond to the questions in the following table.

Source of Water/Water harvesting method	Currently irrigated area (ha)	Potential irrigable area (ha) (*)	Duration of water resources efficiency (**)
River			
Lake			
Spring			
Dam			
Diversion weir			
Community Pond			
Ground water			
Microponds			
Cisterns			
Others			
Total			

(*) Refers to farmers suggestions
(**) High, Medium, Poor

Major types of Irrigated crops

Type of crop	Area (ha)	Productivity (Qlts./ha)

Irrigation methods used (thick the box)

Crops	Irrigation methods				Irrigation interval (days)
	Flood	Furrow	Basin	Others	

Is irrigation also a traditional practice or a recent technology? Since when? Describe the irrigation method in detail.

What are the tenure (ownership/use) arrangements on the irrigated land?

Do you have specific water users associations (indicate local name)? How are they organized?

Describe the main water harvesting and water management systems (add extra pages as required).

What are the major problems regarding irrigation at this moment (technical, managerial, tenure, market etc.)? How do you resolve the problems? Discuss and propose improvements.

Are conservation works integrated with the water harvesting method? If yes, to what extent? Describe their effectiveness.

If not, are they required? Describe in detail.

Are fertility management practices integrated with the irrigation system? What are they? Describe and discuss improvements to be made.

Is there a possibility for an expansion/introduction of irrigation in your area? Where and how? What are your suggestions in this respect?

Have you discussed with BoA staff the potential for additional irrigation? If yes, are your recommendations in line with theirs? Is there already a plan for small scale irrigation? How are you involved? Explain.

What else do you think needs to be done within the community and together with other communities to increase the irrigation potential provided specific watershed based interventions are taking place. Discuss and describe.

Analysis sheet for irrigation
Major constraints for irrigation:
Ranking
1.
2.
3.
Main recommendations regarding irrigation:

PART 6 LAND/N.R. DEGRADATION AND WATERSHED INTERACTIONS

These questions will be refined when you carry out the Description and Problems of your area, (Step 4 of the PWD guidelines) but at this stage it is important to have a preliminary understanding of farmers' perception about land degradation, land use and watershed interactions within and outside the community. It also allows households to discuss strategies and/or suggestions to tackle the problem.

Is there a problem of soil erosion on:
farmland: yes no / grassland: yes no / forest land: yes no
If yes, please describe the problem in respect to the farmers' views:

What are the most negative effects of land degradation in your community? What are the main causes? Describe.

Are traditional protective measures taken? If yes, which ones? Are they effective? Are they sufficient? Can they be replicated without external inputs? If not, with what inputs? Explain.

What are the main limitations of most important traditional measures? Are they sufficient to control erosion? Are they labour intensive or not? What is needed to make them more effective? What is the role of women in traditional soil and water conservation?

IMPORTANT NOTE: Describe thoroughly (design, dimensions, spacing, species, uses etc.) traditional ways of soil&water conservation, forestry and agroforestry, water harvesting, drainage and organic farming if any. This would allow you to either improve valuable traditional measures or to introduce new ones in line with the current farming system and farmer skills (add extra pages if necessary).

Describe the most important soil and water conservation/land management activities carried out in the past till to date through Government and/or other organizations support, indicating for each land use type: the type of activity, the size of the treated area to date and the most important tree species planted. Discuss what is working well and what not, including suggestion for improvement and change:

Main Measures	Date constr./ establ.	Land Use	Area (ha) or No	Effectiveness (erosion control, production, others)	Social acceptance	Management (good, poor, tenure issues, etc.)

For reforestation and agroforestry activities indicate the tree species planted in each land use type (give an estimation in Ha of the area covered by each tree specie)

Land use type	Tree species (type) (dominant)	Ha	Total No of trees (approx.)

What are the species preferred for:
(1) Erosion control?

(2) Income?

(3) Fuelwood and other woody products?

If no conservation measures are taken at the moment, what is the reason?

What measures should be taken to prevent erosion and deforestation in farmers' opinion?

Discuss what are land degradation problems that concern the whole community, specific groups and individuals. What are the key land degradation problems that need to be addressed first in farmers/community's opinion? Explain and discuss the solutions to these problems.

What land degradation problems will require the involvement and participation of adjacent communities based on watershed principles? What would be the main advantages? Describe

Analysis sheet for Land degradation/Soil erosion
Is land degradation/erosion a major problem? Summarize the points:
Ranking
1.
2.
3.
Main recommendations regarding tackling land degradation and develop watersheds:

PART 7 HOMESTEAD DEVELOPMENT AND USE OF MICRO-WATERSHEDSd

What products are grown on the homesteads? Is horticulture practiced? Who is in charge of this activity (men, women)? What are the benefits?

Main activities/practices	Level of adoption amongst households (*)	Ascertained benefits	Potential for adoption and expansion (from HHs' perspective)

(*) Very common, common, moderate, rare

Are they for home consumption or market? How much they contribute to the household economy? Explain using indirect questions.

Are trees planted around homesteads? For what purpose (fodder, bee-keeping, wood, fruits, etc.) Who owns/manage the trees? (men/ women).

How benefits are shared among family members?

Is compost making a common practice? For what purpose (Enset, cereals, home gardens etc.)? Who is in charge of compost making and distribution to the fields/home gardens? Indicate average increased yields.

Describe the composting method.

Are cash crops planted around homesteads (Enset, coffee etc.)? Are women interested to expand their cultivation? What are the preconditions for expansion (markets, inputs, others)?

Describe micro-watershed interactions within homesteads and linkages with broader units between homesteads (farmsteads), larger sub-watersheds within the community and finally the interactions with clusters or broader watershed units with additional communities located in the kebele or adjacent kebeles. (This part is to be discussed amongst CWT members first to visualize untapped opportunities to use existing land and water resources or develop watershed areas to induce water harvesting effects at a significant scale).

Linkages within Homesteads:

Linkages between Farmsteads (groups of homesteads within a micro-watersheds)

Linkages between Farmsteads within and sub-watershed in the community

Linkages with sub-watersheds within broader watersheds treatment

Others

Sketch an average traditional Homestead compound

Analysis sheet for Homestead plantation and improvement
Major problems:
Ranking
1.
2.
3.
Main recommendations regarding homesteads and micro-watersheds development:
_____
_____
_____
_____

PART 8 WOMEN IN COMMUNITY AND WATERSHED DEVELOPMENT

General

This section is to be conducted with the women members of the planning team or with the women PDT.

Occupation

- Women's primary and secondary occupations (specify):

Primary Occupation

_____

_____

Secondary occupation

_____

_____

Work status of women in different occupation:

Status	In agriculture work	In non-agriculture
1. Farmer		
2. Entrepreneur		
3. Permanent hired worker		
4. Casual laborer		
Others		

Work involvement

	Activity	(yes/no)	Average Period (which month/No of days if applicable *)
• Agriculture:	Land preparation		
	Clearing		
	Planting		
	Sowing of seed		
	Transplanting		
	Weeding		
	Harvesting		
	Treshing		
	Winnowing		
• Forestry:	Fuelwood collecting		
	Fuelwood selling		
	Charcoal making		
• Livestock	Herding		
	Poultry		
• Other activities	Water collection		
• Soil Conservation			

(*) Specify which activities are seen as major burden for women and which ones are their main interest.

_____

_____

_____

Women involved in other economic and social activities

Shop keeping: _____
Tailoring & Weaving (workshops): _____
Teaching: _____
Mid-wife: _____
Office clerk: _____
Other cottage industries: _____

Explain their role & importance in terms of decision making, influence, income earning, etc:

_____

_____

_____

- Remuneration earned by women (general)

Type of work	Amounts received	
	In Agriculture	In non Agriculture
a. Casual labour work		
b. Daily wage work		
c. Piece rate work		
d. Others		

- Participation and Decision making role by women

Explain how women are involved in community and household level decision and explore ways and means how this can improve.

- Possible Key: 1.non-existant, 2. low, 3. fair, 4. good, 5. dominant, etc.

	At Household level	At Community level
a. Agriculture Activity (including FFW/CFW)		
b. Other economic activ.		
c. Social activity d. Household		

Discuss opportunities for watershed development at homestead, groups and community levels, particularly related to management of assets, reduction of hardships, access to water, income generation. This discussion needs to include as many women as possible. Describe.

What are the measures that could benefit most needy women headed households? Describe any ongoing effort and suggestions.

Explain main problems regarding participation and decision making of women and recommendations:

PART 9 USE OF COMMUAL AREAS AND WATERSHED MANAGEMENT

Describe rules and regulations regarding the share of and rights to the private and communal land and its products, its allocation to new members, existing bylaws and bodies responsible for settling tenure matters.

How are conflicts and disputes regarding land use issues settled (for instance cutting trees, carelessness in maintaining soil conservation measures that could damage downhill farmers fields, complaints about unequal distribution/use of land etc.)?

What are the traditional arrangements the community has created to support the poorest members of the community? (In some areas farmers are taxing themselves according to their income to help the poorest, old, widows and landless; in other areas the poorest are given priority to implement community works such as roads, ponds etc.).

Discuss possible interventions aimed to enhance solidarity between households and help the poorest members of the community, particularly women headed households.

What are the current communal lands arrangements being pursued? Describe advantages and effects on management of natural resources.

What are the communal land use arrangements shared with other communities within the kebele? What needs to be done to improve overall management of shared/common natural resources?

Main recommendations regarding use of communal area/tenure and common use of broader watershed lands

4) DESCRIPTION AND PROBLEMS OF YOUR TARGET AREA

Delineate the boundaries of the community and the sub-watershed boundaries within which the community is located.

1. Specify the agroclimatic zone (s): _____ % _____
   _____ % _____
2. Size of your area (community/target group) _____ ha
3. Size of the main sub-watershed within which the community is mostly located _____ _____ha
4. Size (approx) of the broader watershed within which cluster of sites are located and form logical and mutually reinforcing broader units _____ ha

IDENTIFICATION NUMBER (MAP): _____ DATE: _____
TOPOMAP No: _____ SCALE: _____
No OF ENLARGEMENTS:_____
AERIAL PHOTO No: _____ SCALE: _____
No OF ENLARGEMENTS: _____

5. Natural Resources & Assets Village Map (By The Planning Team) (Report The Drawing In A Single Or More Pages)
6. Present Land Use, Drainage, Community Infrastructure, Soil And Topographic Surveys

SUMMARIZE THE MAIN FINDNGS ABOUT SOILS, EROSION AND DEFORESTATION IN YOUR AREA

SOILS (TYPE BY LAND USE)

_____
_____
_____
_____
_____

EROSION (MAIN FEATURES, TYPE)

_____
_____
_____
_____

DEFORESTATION

_____
_____
_____
_____

MICRO-WATERSHED AND SUB-WATERSHEDS INTERACTIONS

_____
_____
_____

KEY WATERSHED INTERACTIONS BETWEEN COMMUNITIES WITHIN BROADER UNITS

_____

_____

_____

_____

TABLE ON LAND USE, SOIL TYPE, SLOPES AND PAST EROSION

MAJOR LAND USE	SUB-UNITS	PROPORTION	PROPORTION	SLOPES (%)					SOIL TEXTURE			SOIL DEPTH				PAST EROSION		
		(ha)	(%)	< 3	3 - 15	15 - 30	30 - 50	> 50	COARSE	MEDIUM	HEAVY	< 25 cm	25 - 50 cm	50 - 100 cm	> 150 cm	SHEET	RILL	GULLY
CULTIVATED LAND	CU1																	
	CU2																	
	CU3																	
	CU4																	
	CU5																	
GRAZING LAND	GR1																	
	GR2																	
	GR3																	
	GR4																	
FOREST LAND (include woodlots)	FE1																	
	FE2																	
	FE3																	
	FE4																	
MISCELLANEOUS LAND (SPECIFY)	MSC1																	
	MSC2																	
	MSC3																	
VILLAGE (HOMESTEADS)	V																	
TOTAL		100																

BASE MAP (+ LEGEND)

COMMUITY BASED WATERSHED DEVELOPMENT MAP (+ LEGEND)

(Sample of each Measure semi-detail description sheet)

1. _____ Unit (ha, km,No) _____
Reasons for selection (Why, How and Where) in relation to farmers problems/priorities:

_____

_____

Technical design (draw a figure below):

_____

_____

Integration (if supplementary activities are required) of the measure:
1. _____
2. _____
3. _____

Explain main role in watershed interactions:

_____

_____

Implementation schedule:

_____

_____

Preconditions for implementation:

* Labour requirements and work norm:

_____

_____

* Inputs (type and amount) required:

_____

_____

* Extension/training requirements:

_____

_____

Cost-benefit estimate

_____

_____

Figure (sketch design – dimensions, spatial arrangement, etc.)

5) Planning and reporting tables

TABLE 9.1 MULTI-YEAR (3 - 5) TARGETS FOR IMPLEMENTATION

CODE	SELECTED MEASURES	UNIT	Year 1	Year 2	Year 3	Year 4	Year 5

(*) Remember that only year 1 targets will be broken down into quarterly & monthly targets (tables 3/1 and 3/2)

TABLE 9.2 MULTI-YEAR (3 - 5) LABOUR REQUIREMENTS

				Year 1		Year 2	Year 3	Year 4	
CODE	SELECTED MEASURE	UNIT	WORK NORM	PERSON DAYS (SELF-HELP)	PERSON DAYS (FFW/CFW)	General projection PERSON DAYS	General projection PERSON DAYS	General projection PERSON DAYS	General projection PERSON DAYS

(*) REMEMBER THAT ONLY YEAR 1 TARGETS WILL BE BROKEN DOWN INTO QUARTERLY AND MONTHLY TARGETS (TABLES 3-1 and 3-2)

IMPORTANT NOTE:

1) Food or cash requirements for on-going (Safety nets, FFW-MERET, NGOs, etc) and emergency (relief supported effective EGS) conservation-based activities are based on Table 1 projections. Food requirements for Years 2 - 5 are only indicative.

2) Food and/or cash requirement is calculated by multiplying the work norm (person days per unit of work) by the target.

for example, 10 km of soil bunds at 150 person days per km (work norm) x 0.03 (1 person day equivalent to 3 kg of grain or 0.03 Qls.) = 45 Qls. of grain are needed for 10 km of bunds.

TABLE 9.3/1 SELF-HELP ACTIVITES (Participation by Community and Groups)

				YEAR 1									
				Jan-March		April-June		July-Sept		Oct-Dec		Total	
CODE	SELECTED MEASURE	UNIT	WORK NORM	TARGET	PERSON DAYS	TARGET		TARGET	PERSON DAYS	TARGET	PERSON DAYS	TARGET	PERSON DAYS

TABLE 9.3/2 YEAR 1 FOOD/CASH REQUIREMENTS FOR LABOUR INTENSIVE WORKS

				YEAR 1									
Colde	SELECTED MEASURE	UNIT	WORK NORM	JAN - MARCH		APRIL - JUNE	JULY - SEPT		OCT - DEC		TOTAL		
				TARGET	Grain (Qls) or Cash (Birr)	TARGET	Grain (Qls) or Cash (Birr)	TARGET	Grain (Qls) or Cash (Birr)	TARGET	Grain (Qls) or Cash (Birr)	TARGET	Grain (Qls) or Cash (Birr)

NOTE: Fill this table if you use resources such as CFW or FFW. Circle the resources used. If you use both prepare two tables.

TABLE 9.4 YEAR 1 SCHEDULE - ALL ACTIVITIES

			JAN -MARCH			APRIL - JUNE			JULY - SEPT			OCT - DEC	
			JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
CODE	SELECTED MEASURE	UNIT												

NOTE: THE SCHEDULE IS BASED ON THE EXPECTED LABOUR AVAILABILITY UNDER NORMAL CONDITIONS

TABLE 9.5 PLANTING MATERIALS REQUIRED

		SEEDS (Name & weight in kg)		SEEDS (tree species)	TOTAL NUMBER OF	OTHER (cuttings, splits etc.)
SELECTED MEASURES	UNIT	GRASS	LEGUME	(Name and weight in kg.)	SEEDLINGS	
		................../..........	................../..........	................../..........	....	....
		................../..........	................../..........	................../..........	....	....
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NOTE: The estimation of planting material needed for implementation should help you to organize your nursery activity

REMARKS:

TABLE 9.6 TRAINING REQUIREMENTS (*)					
TRAINING/FIELD DAY SUBJECT	PARTICIPANTS	NO OF PARTICIPANTS	No OF DAYS	PERIOD (MONTH)	REMARKS
A) _____					
B) _____					
C) _____					
D) _____					
E) _____					

(*) THE ABOVE REQUIREMENTS INCLUDE ONLY THE TRAINING SUBJECT AND THE PARTICIPANTS. DETAILS ON BUDGET AND MATERIALS NEEDED SHOULD BE DISCUSSED WITH THE WEREDA EXPERTS AND ESTIMATED ACCORDINGLY FOR THE WHOLE WEREDA

TABLE 9.7 MATERIALS REQUIRED (*)

	UNIT	TOTAL REQUIRED (3-5 years)	QUANTITY AVAILABLE	QTY. TO BE REQUESTED	REMARKS
1. TOOLS		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
2. SURVEY EQUIPMENT		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
3. STATIONERY		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
4. OTHERS		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	
		.....	.....	.....	

(*) Do not estimate unrealistic amounts of tools and other items. Assess what is available at the community level and what can be provided at the watershed and higher levels.

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